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NEXT ANNUAL MEETING
MAY 17 AND 18, '05
CHATTANOOGA, TENN.

ASSOCIATION

OF

Railway Telegraph Superintendents

PROCEEDINGS

OF THE

ANNUAL MEETING HELD AT INDIANAPOLIS, IND.

JUNE 15th and 16th, 1904

CONSTITUTION, BY-LAWS, LIST OF MEMBERS, ETC.

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1904

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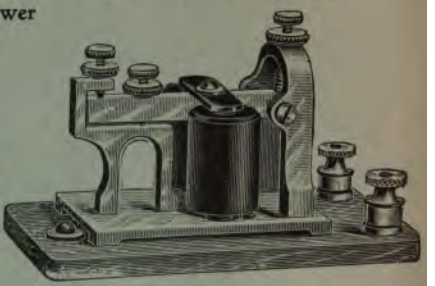
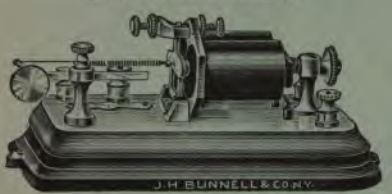


Giant Sounder.



J. H. B. & Co.'s Standard Relay No. 1. Improved. The finest finished, most sensitive and substantial Relay ever made.

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Figure 12½.

MASCOT RESONATOR

Portable can be moved to any desired position within range of cord. The cord enters base as shown and passes through the hollow stem to Sounder

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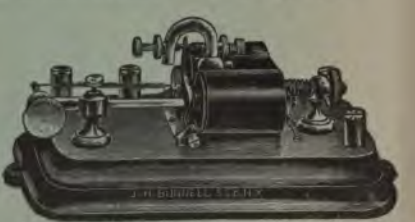

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POSTAL TEL. CO.'S MODEL.

ASSOCIATION

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Railway Telegraph Superintendents

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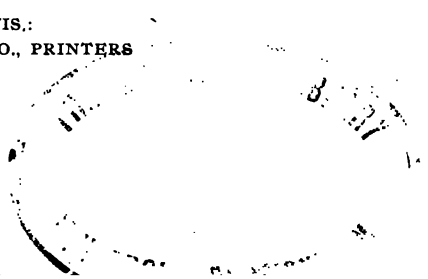

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ANNOUNCEMENT

The Association was formed in Chicago, November 20, 1882. Its object is the improvement of the railway telegraph service.

The next annual meeting will be held at Chattanooga, Tenn., May 17th and 18th, 1905.

The undersigned will be glad to answer any inquiries in reference to the Association.

H. C. HOPE, President,
St. Paul, Minn.

E. E. TORREY, Vice-President,
Jackson, Tenn.

P. W. DREW, Sec'y and Treas.,
Milwaukee, Wis.

Form 5 ... BOOK

THE ASSOCIATION

OF

Railway Telegraph Superintendents

CONSTITUTION AND BY-LAWS

PAST PRESIDENTS

W. K. Morley.....1882
W. K. Morley.....1883
C. Selden 1884
C. W. Hammond.....1885
A. R. Swift.....1886
Geo. L. Lang.....1887
Geo. C. Kinsman.....1888
C. A. Darlton.....1889
G. T. Williams.....1890
C. S. Jones.....1891
L. H. Korty.....1892
U. J. Fry.....1893
O. C Greene.....1894
G. M. Dugan.....1896
J. W. Lattig.....1897
W. W. Ryder.....1898
L. B. Foley.....1899
W. F. Williams.....1900
C. F. Annett.....1901
J. H. Jacoby.....1902
C. S. Rhoads.....1903

OFFICERS

1903-4

PRESIDENT.

H. C. Hope.....C. St. P. M. & O..... St. Paul, Minn.

VICE-PRESIDENT.

E. E. Torrey.....M. & O..... Jackson, Tenn.

SECRETARY, TREASURER.

P. W. Drew.....Wisconsin Central .... Milwaukee, Wis.

COMMITTEES

ARRANGEMENTS FOR ANNUAL MEETING.

G. L. Lang.....Q. & C.....Chattanooga, Tenn.
J. B. Norris.....Mgr. W. U. Teleg. Co..Chattanooga, Tenn.
F. A. Gentry.....Mgr. E. Tenn. Tel. Co..Chattanooga, Tenn.

TOPICS.

E. J. Little.....G. N. .....St. Paul, Minn.
E. H. Millington.....M. C. .....Detroit, Mich.
A. B. Taylor.....N. Y. C. & H. R..... Weehawken, N. J.

CIPHER CODE.

C. S. Rhoads.....C. C. C. & St. L.....Indianapolis, Ind.
J. H. Jacoby.....L. V. .....So. Bethlehem, Pa.
C. M. Lewis.....P. & R.....Reading, Pa.

TYPEWRITER IN RAILROAD SERVICE.

W. F. Williams.....S. A. L.....Portsmouth, Va.
S. A. D. Forristall.....B. & M.....Boston, Mass.
E. A. Chenery.....M. Pac. .....St. Louis, Mo.

COMMITTEE ON COMPOSITE CIRCUITS.

U. J. Fry.....C. M. & St. P.....Milwaukee, Wis.
Geo. F. Weidman.....P. M. .....Detroit, Mich.
L. B. Foley.....D. L. & W.....New York, N. Y.

USE OF TELEPHONE FOR TRAIN ORDERS.

C. Selden .....B. & O.....Baltimore, Md.
E. P. Griffith.....Erie .....New York, N. Y.
J. H. Jacoby.....L. V. .....So. Bethlehem, Pa.

LIST OF ACTIVE MEMBERS

NAME	RAILROAD	ADDRESS
H. C. Hope	C., St. P. M. & O.	St. Paul, Minn.
C. S. Rhoads	C. C. C. & St. L.	Indianapolis, Ind.
J. H. Jacoby	L. V.	So. Bethlehem, Pa.
W. F. Williams	S. A. L.	Portsmouth, Va.
L. B. Foley	D., L. & W.	New York, N. Y.
W. W. Ryder	C. B. & Q.	Chicago, Ill.
G. M. Dugan	Illinois Central	Chicago, Ill.
O. C Greene	Northern Pacific	St. Paul, Minn.
U. J. Fry	C., M. & St. P.	Milwaukee, Wis.
L. H. Korty	Union Pacific	Omaha, Neb.
C. Selden	Baltimore & Ohio	Baltimore, Md.
G. C. Kinsman	Wabash	Decatur, Ill.
Geo. L. Lang	Q. & C.	Chattanooga, Tenn.
C. P. Adams	Southern	Washington, D. C.
E. A. Chenery	Missouri Pacific	St. Louis, Mo.
G. H. Groce	Illinois Central	Chicago, Ill.
E. H. Millington	Michigan Central	Detroit, Mich.
H. C. Sprague	St. L. & S. F.	Springfield, Mo.
M. Magiff	Central Vermont	St. Albans, Vt.
A. B. Taylor	N. Y. C. & H. R.	Weehawken, N. J.
F. G. Sherman	C. R. R. of N. J.	Jersey City, N. J.
S. K. Bullard	M., K. & T.	Sedalia, Mo.
P. W. Drew	Wisconsin Central	Milwaukee, Wis.
C. B. Phelps	L. & N.	Louisville, Ky.
C. H. Gaunt	A., T. & S. F.	Topeka, Kan.
E. E. Torrey	M. & O.	Jackson, Tenn.
W. A. Freeze	C. & A.	Bloomington, Ill.
W. W. Ashald	G. T.	Montreal, Can.
Wm. Kline	L. S. & M. S.	Toledo, O.
E. A. Klippel	O. R. & N.	Portland, Ore.
V. T. Kissinger	B. & M. R.	Lincoln, Neb.

NAME	RAILROAD	ADDRESS
J. S. Stevens	C. & O.	Richmond, Va.
E. P. Griffith	Erie	New York, N. Y.
H. S. Balliet	L. V.	So. Bethlehem, Pa.
S. A. D. Forristall	B. & M.	Boston, Mass.
W. F. Taylor	Penna R. R.	Altoona, Pa.
W. J. Holton	Chi. & West. Ind.	Chicago, Ill.
E. J. Little	Great Northern	St. Paul, Minn.
W. C. Walstrum	N. & W.	Roanoke, Va.
F. S. Spafard	C. R. I & P.	Chicago, Ill.
J. P. Boyle	K. & W.	Centerville, Iowa.
W. P. McFarlane	F., E. & M. V.	Omaha, Neb.
L. S. Wells	L. I. R. R.	Long Island City, N. Y.
G. B. McCoy	Y. & M. V.	Greenville, Miss.
H. A. Tuttle	M., St. P. & S. S.	Minneapolis, Minn.
F. A. C. Ferguson	Miss. Valley	Greenville, Miss.
W. L. Bisbee	H. & T. C.	Houston, Tex.
W. P. Cline	A. C. Line	Wilmington, N. C.
A. E. Roome	So. Pac.	San Francisco, Cal.
R. L. Logan	K. C. So.	Kansas City, Mo.
C. M. Lewis	P. & R.	Reading, Pa.
W. B. Glardon	D. & R. G.	Denver, Colo.
G. F. Weidman	P. M.	Detroit, Mich.
C. A. Parker	D. N. W. & P.	Denver, Colo.
F. H. Van Etten	C. & E. I.	Danville, Ill.
J. Munday	C. & S.	Denver, Colo.
F. G. Adams	B. & O.	Baltimore, Md.
W. H. Potter	Southern	Washington, D. C.
Percy Hewitt	Sou. Pac.	Houston, Texas.
E. Parsons	Ill. Central	Chicago, Ill.
E. E. McClintock	C. & W.	Denver, Col.
W. J. Camp	C. P.	Montreal, Canada.

ASSOCIATE MEMBERS

A. P. Eckert.....New York.
C. E. Brown .....Chicago
W. H. Adkins.....Atlanta
C. E. Yetman.....New York
G. W. Conklin.....New York
E. W. Vogel.....Chicago
J. J. Ghegan .....New York
M. J. O'Leary.....New York
C. F. Annett.....Chicago
B. A. Kaiser.....New York
J. E. Gordon.....New York
C. A. Adams-Randall.....New York

HONORARY MEMBERS

Thos. A. Edison.
T. D. Lockwood.
Ralph W. Pope.
J. C. Ford.
J. J. Burnes.
J. B. Stewart.
A. J. Earl.
C. H. Bristol.
C. E. Freeman.
W. E. Athearn.
Wm. Maver, Jr.
Geo. C. Maynard.
W. K. Morley.
W. S. Logue.
F. P. Valentine.
W. E. Gilmore.
J. M. Stephens.
J. H. Louy.
H. V. Miller.
F. L. Blendinger.
T. B. Cummings.
M. F. B. Weeks.
H. F. Houghton.
J. F. Wallick.
W C. Brown.
Geo. W. Stevens.
W. M. Greene.
F. S. Gannon.
Geo. T. Williams.
I. N. Miller.
J. B. Tree.
T. R. Taltavall.
J. W. Fortune.
W. J. Murphy.
C. D. Gorham.
Charles McLaughlin.
J. B. Taltavall.
E. A. Smith.
C. G Sholes.
J. H. Hill.
A. R. Swift.
K. McKenzie.
E. Borden.
F. E. Clary.
Wm. A. Porteous.
H. V. Mielly.
C. A. Darlton.

CONSTITUTION

ARTICLE I.

Title.

The organization shall be known as "The Association of Railway Telegraph Superintendents."

ARTICLE II.

Object.

The object of this Association shall be : "The Improvement of the Telegraph Service," and the promotion and advancement in general of the interests of the telegraph department of railroads.

ARTICLE III.

Who may be Members.

Sec. 1. The membership of the Association shall be of three classes: Active, Associate and Honorary.

Sec. 2. Who may be Active Members:

Anyone connected in an official capacity with the telegraph, telephone, electric light, electric power, or electric signal department of any railroad, may become an Active Member of this Association, by subscribing to the Constitution and paying into the Treasury $5.00 per annum and receiving a majority vote of the members present.

Sec. 3. Who may be Associate Members:

Anyone connected with a telegraph or telephone supply house or publication may become an Associate Member, subject to receiving a majority vote of the members present and paying into the Treasury $5.00 per annum.

Associate Members shall be entitled to all the rights and privileges of Active Members, except that they shall not be allowed to vote.

Sec. 4. Who may be Honorary Members:

Men prominent in Railway Telegraph or Telephone circles, and those who have by furnishing papers and otherwise contributed to the success of the Association, and any Active Member, who is in good standing as to payment of dues, leaving the service of railroad companies or of the departments mentioned in Sec. 2, may become an Honorary Member upon receiving a majority vote of members present. Honorary members shall be entitled to all the rights and privileges of Active Members except that they shall not be allowed to vote.

ARTICLE IV.

Officers.

The officers of this Association shall be elected by ballot, and shall hold office for one year, or until their successors are chosen. They shall consist of a President, Vice-President, Secretary and Treasurer; the last two offices may be filled by one person. The officers of this Association shall constitute an Executive Committee.

ARTICLE V.

Duties of Officers.

President—The President shall preside at all meetings of the Association, and perform such other duties as are generally performed by that officer.

Vice-President—The Vice-President shall preside in the absence of the President, and when so acting shall be governed by the rules prescribed for that officer.

Secretary—The Secretary shall keep correct minutes of each meeting, and cause the same to be printed immediately after adjournment, and send to each member two copies of the same. He shall also notify the members, by circular, of the time and place of each meeting, and perform such other duties as may be required by the Executive Committee.

Treasurer—The Treasurer shall collect all moneys due the Association, giving his receipt therefor, pay all bills contracted for by it, upon the approval of the Executive Committee, and at each annual meeting render a detailed statement of the receipts and expenditures of the previous year, which statement shall be printed with the proceedings of the meeting at which it is presented. In order to meet expenses in excess of the receipts from annual dues, he shall levy a pro rata assessment upon the members of the Association.

ARTICLE VI.

Vacancies.

In case of a vacancy in any office, it shall be filled for the remainder of the year by the Executive Committee.

ARTICLE VII.

Meetings.

Seven members shall constitute a quorum at any meeting.

Amendments to the Constitution.

This constitution shall be changed only by an amendment offered in writing at a regular meeting, one month's notice having been given to each member by the Executive Committee, and can only be adopted by an affirmative vote of two-thirds of the members present.

BY-LAWS

1. The Executive Committee is authorized to declare applicants acting members previous to the annual meeting.

2. The annual meeting of this Association shall be held at such time and place as shall be designated by the majority vote of members at a previous meeting.

3. Special meeting may be held upon the call of the Executive Committee, when requested by seven or more members.

4. Any member who is in arrears in payment of dues ninety days after the annual meeting shall be considered suspended, and should dues not be paid on or before the succeeding annual meeting, his name shall be dropped from the roll of membership.

ORDER OF BUSINESS

At all meetings the following shall be the order of business:

1. Election of New Members.
2. Reading the Minutes of Regular and Special Meetings.
3. Report of Treasurer.
4. Reports of Standing Committees.
5. Reports of Special Committees.
6. Election of Officers.
7. Miscellaneous Business.
8. Adjournment.

Minutes of the Proceedings of the Twenty-second Annual Convention, Association of Railway Telegraph Superintendents, held at Indianapolis, Ind., June 15th and 16th, 1904

MINUTES OF THE PROCEEDINGS

OF THE

Twenty-third Annual Convention

Association of Railway Telegraph Superintendents.

The Convention was called to order by President C. S. Rhoads, at Hotel English, Indianapolis, at 10 A. M., June 15th, 1904. The roll was called by the Secretary, P. W. Drew, and showed the following attendance:

C. S. Rhoads & Wife..	C. C. C. & St. L.....	Indianapolis.
H. C. Hope & Daughter.	C. St. P. M. & O.....	St. Paul.
E. E. Torrey.....	M. & O.....	Jackson, Tenn.
U. J. Fry.....	C. M. & St. P.....	Milwaukee.
W. F. Williams.....	S. A. L.....	Portsmouth, Va.
P. W. Drew & Wife...	Wis. Central.....	Milwaukee.
W. W. Ryder & Wife..	C. B. & Q.....	Chicago.
G. L. Lang.....	Q. & C.....	Chattanooga, Tenn.
Chas. Selden, Wife & Daughter.	B. & O.....	Baltimore.
W. P. Cline.....	A. C. Line.....	Wilmington, N. C.
Geo. F. Weidman.....	P. M.	Detroit.
W. W. Ashald.....	G. T.	Montreal.
G. C. Kinsman, Wife & daughter.	Wabash	Decatur.
E. A. Chenery.....	Mo. Pac.	St. Louis.
F. S. Spafard & Wife..	C. R. I. & P.....	Chicago.
E. E. McClintock.....	C. & W.....	Denver.
E. H. Millington.....	M. C.	Detroit.
F. G. Freeze.....	C. & A.....	Bloomington, Ill.
E. P. Griffith, Jr.....	.....	New York.
E. P. Griffith & Wife..	Erie	New York.
H. C. Sprague.....	St. L. & S. F.....	Springfield, Mo.
J. H. Jacoby.....	L. V.	So. Bethlehem, Pa.
L. B. Foley & Wife...	D. L. & W.....	New York.
Geo. M. Dugan.....	I. C.	Chicago.
Wm. Kline	L. S. & M. S.....	Toledo.
E. Parsons	I. C.	Chicago.
V. T. Kissinger.....	C. B. & Q.....	Lincoln, Neb.
J. S. Stevens.....	C. & O.....	Richmond, Va.
F. H. Van Etten.....	C. & E. I.....	Danville, Ill.
W. J. Camp.....	C. P.	Montreal.
R. L. Logan.....	K. C. Line.....	Kansas City, Mo.

E. W. Vogel & Wife...	R. R. Supply Co.....	Chicago.
A. P. Eckert, Wife & D.	Safety I. W. & C. Co...	New York, N. Y.
M. J. O'Leary & Wife..	Secy Tel. M. Ben. As..	New York, N. Y.
B. A. Kaiser & Wife...	Am. T. & T. Co.....	New York, N. Y.
J. E. Gordon.....	N. Y. & N. J Tel Co...	Newark, N. J.
C. A. Adams-Randall...	A. R. Tel. Co.....	New York, N. Y.
J. J. Ghegan.....	J. H. Bunnell Co.....	New York, N. Y.
Wm. Maver Jr., & Wife.	Elec. Engineer.....	New York, N. Y.
J. B. Taltavall & Wife.	Telegraph Age.....	New York, N. Y.
J. N. Miller.....	Supt. W. U. Tel.....	Cincinnati, Ohio.
J. F. Wallick.....	Supt. W. U. Tel.....	Indianapolis, Ind.
C. E. Freeman.....	Armour Institute.....	Chicago, Ill.
Frank F Fowle.....	A. T. & T. Co.....	New York, N. Y.
A. G. Francis.....	Chi. Telephone Co.....	Chicago, Ill.
Norris R. Fill.....	A. T. & T. Co.....	New York, N. Y.
Wm. J. Maiden & Wife.	Cent. Union Tel. Co...	Indianapolis, Ind.
D. R. Davies.....	W. U. Tel. Co.....	Chicago, Ill.
H. B. McMeal.....	Tel. Publishing Co.....	Chicago, Ill.
M. J. Hedgton.....	Adams-Randall Co.....	New York, N. Y.
M. D. Atwater.....	Cent. Union Tel. Co...	Indianapolis, Ind.
H. O. Rugh.....	W. Telegraphon Co....	Chicago, Ill.
F. B. Hubbard.....	.....	Tacoma, Wash.
G. M. Dodge.....	.....	Valparaiso, Ind.
C. T. Hendrickson.....	B. & O. S. W.....	Cincinnati, Ohio.
P. W. Miller.....	A. T. & T. Co.....	New York, N. Y.
B. F. Thompson.....	B. & O. R. R.....	Baltimore, Md.
Jesse Bunnell	J. H. Bunnell & Co....	New York, N. Y.
W. W. Mulford.....	Amn. T. & T. Co.....	St. Louis, Mo.
C. K. Jones.....	.....	Quincy, Ill.
E. E. Stacey & Wife.....	.....	Indianapolis, Ind.
H. F. Houghton & Wife.	Asst. Gen. Supt. CCC. St. L.	Indianapo'is
R. D. Fisher.....	Western Electrician....	Chicago, Ill.
Herman Rhoads	.....	Indianapolis, Ind.

Secretary Drew: I wish to announce, now, while we are waiting for the Mayor, that you will notice in the programs that the courtesies have been extended by the telegraph companies, the Western Union and the Postal, as is usual, and any member who desires to telegraph home to his wife, or family or friends, may have his messages sent free from the office downstairs, upon the presentation of his identification card. The Central Union Telephone Company have extended their courtesies at any time in the evening, after the business hours, so that you can use the long distance telephone from then on.

President Rhoads: It might be well to say at this time, that the Banda Rossa gives a concert this evening out in front of the hotel, near the monument, and that the hotel people have arranged to reserve the balcony for the members of the Association and their friends. It is advised that as many of the guests as have rooms along that wing of the hotel take care of as many of their friends as possible, as they are the best places. This evening, I hope as many as can will arrange to remain about the hotel and hear the concert and have a social time.

The Honorable John W. Holtzman, Mayor of the City of Indianapolis, having just entered the room, President Rhoads said:

In coming to order at this, our Twenty-Third Annual Meeting, we have special cause to rejoice, when we learn that while Father Time is silently adding white hairs to some of our heads, he has at the same time dealt gently with us, as no member of our Association has been called over Jordan since last we met, which we will hope is an indication that we "remembered our Creator in the days of our youth." It is not my province to make any extended remarks at this time in welcoming you to this beautiful city, as that will be befittingly done by our distinguished Mayor. Being a Hoosier by adoption only, I feel free to speak a word, however, about my adopted country. The ancient

saying, that "once a Roman always a Roman," I am sure holds good as applied to Indiana. Men in some other states, who achieve greatness in statesmanship, literature or art, often migrate to Washington, New York, or perhaps Paris. Not so with the Hoosier: there is no place like home with him, and Indiana has no small number of distinguished sons, (and, I might say, daughters). Her people represent the independent in thought when it comes to voting. A man to obtain, and hold for any length of time, political preferment in Indiana has to have clean hands and lofty ideals. It was a reputation of this nature which was the forerunner of our present municipal executive's election, and up to this time the people have not been disappointed. I have the honor of introducing to the Convention, Mr. J. W. Holtzman, Mayor of Indianapolis, who, I trust, will loan us the key to the doors of all that is good in a goodly city.

Mayor Holtzman: Mr. President, Ladies and Gentlemen —I am certainly embarrassed by reason of the personal allusion of your chairman. I feel highly honored in being invited to be present in so goodly a company,—I was going to say, in so good looking a company, but the ladies might think I was good at flattery, or the word might get back to my wife and cause trouble at home,—but I feel it an honor to be invited to address a meeting of this kind and I feel that the City of Indianapolis has been honored in being selected as the meeting-place of your Association. And I hope that during your entire stay here nothing will occur to change the opinion I believe you have of the City of Indianapolis.

You have come to a city which I believe to be the most beautiful inland city in the world, and one of the most progressive cities of our country, and I believe that we owe its beauty and its progressiveness very largely to the fact that it has been a city that has been kept clean, not only physically, but morally. I feel, also, that we owe to the men engaged in your line of business much of the progress of the City of Indianapolis and the State of Indiana. It is

true that we owe much of the pleasure of life to you, because I think one of the great pleasures in the individual life in any community is the morning paper, and of how little worth would that be to us if it were not for the telegraph, because it is that which brings us the news from all over the world,—brings it, not in the old way of a hundred years ago, but it comes to us like a flash of lightning. Hardly has an event of importance taken place until it is flashed to our newspapers, and they, in their zeal and enterprize, give it to us in a few minutes afterward in printed form upon the streets of our city or in our houses. The pleasure would be but little after all if it were not for your great work.

And I believe that the men of Indiana,—and I also am an adopted son, but I believe with your President that when a man once comes to the State of Indiana and lives here long enough to become acquainted with her institutions and with her people, he will become so enamored with our great state that it will be very difficult,—it will be with some heart-burning that he will leave, and I hope that those of you who are not residents of the State of Indiana will remain here long enough to get acquainted with the hospitality of our people, because I do believe that no greater hospitality exists on our continent than that of the Hoosier commonwealth.

There was a time when to be a citizen of Indianapolis did not bring with it quite the honor that it does now. It is even told of some of our predecessors that when they traveled to other cities they did not register from Indiana, but from New York or some other place because they felt that there was some odium attached to being a resident of Indiana. But we are glad to say that Indiana stands as high as any other state in the Union and our men have occupied as great places as it has been given to men to occupy in the world, and as Hoosiers, we ought to feel grateful, and I do feel grateful for all of this.

Permit me to say that I will not give you the keys to the city. The gates will be left unlocked during your stay, because I am satisfied that the men who are capable of accomplishing as much as you have, the men (and the women here) who are capable of "doing something," are not the kind to whom the gates need ever be locked;—therefore they shall remain open. And may our welcome to you be so warm and so cordial, and may all the courtesies of this city be given you, and may you be made to feel that sometime in the near future you may again hold the meetings of your Association within our gates. I thank you.

President Rhoads: Ladies and Gentlemen—Our Mayor has not told us yet from what place he came. I thought he was a native Hoosier, but it is clear to me now that he came from Ohio, like some of the rest of our distinguished men, therefore you need not be surprised if we elect him United States Senator some time, as both of our senators at this time are Ohio born.

Mayor Holtzman: I wish to correct the chairman. I was born in Pennsylvania, and I have no presidential aspirations.

President Rhoads: I will call upon Mr. Selden in behalf of the Convention to say a word in response to our Mayor's welcome.

Mr. Selden: Mr. President, Ladies and Gentlemen—The Mayor of your goodly city began by saying that he felt much embarrassed. So do I. I had no idea of being called upon to reply to your kindly welcome, Mr. Holtzman. We are already delighted with your city and we who have been here before are surprised at the wonderful growth you have made,—your elegant streets and your lovely residence portion. I am sure that there are none of us who will regret their visit to such a city as this. For myself, I am always glad to come here. We have heard your kind words and we appreciate everything you have said about the hospitality of your city, and, on the part of this Association, I

beg simply to thank you and accept your hospitality with gratefulness.

President Rhoads: The chair would entertain a motion to adjourn for five minutes to afford a word of personal greeting to the Mayor.

Motion made, seconded and carried.

President Rhoads: The meeting stands adjourned for five minutes.

After a recess of five or six minutes, President Rhoads called the meeting to order.

President Rhoads: The Chairman of the Entertainment Committee, Mr. Maiden, has something to say before the ladies leave us, in regard to the entertainment.

Mr. Maiden: I don't know that I can add anything further as to the program than what has been outlined, except to say that it is highly important that all participants in the excursion be at the place specified at the hour specified, because these cars have to come in line with the other cars and you should all be here at Market and Illinois streets at 2 o'clock in accordance with the program. If it could be arranged at 12:30 or 1:00 o'clock, we would like to have you all stand for your photographs over here on the monument steps. I think we had better specify an exact time, 12:30 or a quarter to one.

After a little discussion, it was agreed to stand for the photograph at 1:30, as the meeting was to adjourn at 12:30 and there must be time allowed for lunch.

Mr. Maiden: To-morrow, the excursion at 1:30 around the Belt. It is essential that you should be at the station at that time for the reason that it is absolutely necessary to start the train out at 1:30 in order to precede the Big Four trains that follow, and we want to get out of their way. As I stated before, I do not see that I can add anything further than what is outlined in the program.

Secretary Drew: The Central Union Telephone Company has distributed cards with the name of each on them, which you can use as Mr. Maiden will explain.

Mr. Maiden: These are franks for long distance use between the hours of 6:00 P. M. and 8:00 A. M., and for local use at all hours at all pay stations. We have issued the franks to those whom we are quite certain are here, but there are some whose names we did not have and they can get their franks by giving me their names.

President Rhoads: Gentlemen, the regular order of business; the first item is the election of new members.

Secretary Drew: I would ask if there are any applications besides those that we have received. I will read, however, those that we have and you can add names if there are any here who are omitted. Some of these names will already be found upon our list of membership, but they have not yet been acted upon. Their names were added during the year, as is our custom.

G. H. Groce	Ill. Central Ry	Chicago, Ill.
W. P. Cline	A. C. Line	Wilmington, N. C.
R. L. Logan	K. C. Southern	Kansas City, Mo.
Percy Hewitt	Sou. Pac.	Houston, Texas.
E. A. Klippell	O. R. & N. Co	Portland, Ore.
E. E. McClintock	C. & W	Denver, Colo.
C. A. Parker	D. N. W. & P	Denver, Colo.
W. J. Camp	Can. Pac.	Montreal, Quebec.
Wm. Kline	L. S. & M. S	Toledo, O.
V. T. Kissinger	C. B. & Q	Lincoln, Neb.
E. Parsons	Ill. Cent.	Chicago, Ill.

Secretary Drew: These are all of the names of active members that I have received and if there are any others who wish to apply at this time, I should be glad to have their names.

I have also the names of five associate members.

W. Tel. Co	C. F. Annett	Chicago, Ill.
A. T. & T. Co	B. A. Kalser	New York, N. Y.
	C. Adams-Randall	New York, N. Y.
N. Y. & N. J. Tel. Co.	J. E. Gordon	Newark, N. J.
J. H. Bunnell Co	J. J. Ghegan	New York, N. Y.

President Rhoads: Are there any other names?

Secretary Drew: If there are no other names, I move you, Mr. President, that these members be declared active or associate members of the Association.

Seconded and carried.

Mr. Lang: I move that the name of John F. Wallick be added to our honorary list.

Seconded and carried.

I move that the name of Mr. F. E. Clary be also added to our honorary list.

President Rhoads: It is my recollection that his name is already on the honorary list.

Secretary Drew: F. E. Clary is now an honorary member.

Mr. William: Mr. President, I notice an omission in the printed list of honorary members. Mr. J. M. Stephens was elected an honorary member, but his name does not appear in the printed list. Look at page 24.

Secretary Drew: Mr. Stephens is an honorary member; his name was accidentally omitted in some way.

President Rhoads: Without any action of the meeting in regard to that, we will add his name to the list in getting out the minutes of this meeting. The next in order is the reading of the minutes of the regular and special meetings. What is your pleasure?

Mr. Selden: I move that the honorary members' list be increased by the name of Mr. Charles Darlton, of the Southern Railway.

Seconded and carried.

President Rhoads: I might mention for the benfit of some of the gentlemen who might not have heard of that change, that Mr. C. P. Adams has lately succeeded Mr. Darlton as superintendent of telegraph of the Southern Railway.

If there are no objections, as the minutes of the previous meeting have been printed and distributed (if there is any member that has not heretofore had a copy of these minutes, he can get it at this time), we will omit the reading of the minutes of the New Orleans meeting and pass on to the report of the treasurer.

Secretary-Treasurer Drew: The report of the treasurer is as follows:

TREASURER'S REPORT.

RECEIPTS.

On Hand May 13th, 1903	$ 24.70
Fees and Dues	330.00
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Minutes Sold	17.75
Total	$628.45

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Printing Cards and Circulars	3.50
Postage, Express and Exchange	7.78
Badges	22.40
Secretary's Salary	300.00
Cash on Hand	3.85
Total	$628.45

I wish to say in regard to the minutes, that it is quite flattering to the Association, the demands that were made on us for minutes by those who pay for them. The United States Government took minutes way back to the earliest records. On request from the treasury department, we made up a bundle for them and they sent a voucher for me to fill in and they gave us a United States treasury warrant. We have also sent some to various organizations,—they have paid for them. We have distributed, also, as you know, to a great many of our friends and other associations—to state and other public libraries. They go to London and Belgium and Manila. They are pretty generally distributed.

President Rhoads: Gentlemen, you have heard the report of the treasurer, what will you do with it? What is your pleasure?

Motion to accept made, seconded and carried.

President Rhoads: It is safe to say that our treasurer would not go to Canada just at present on account of the surplus in the treasury.

A Voice: He makes a better showing than some of the railroads that hold over items in order to report a balance.

Secretary Drew: I am very glad to say that the Association does not owe a cent and we have three dollars and eighty-five cents balance.

President Rhoads: The next in order is the reports of the standing committees.

Secretary Drew: We have, Mr. President, a large roll of letters and telegrams of regret. I will not read them all, but will just simply mention the names.

F. E. Bently	Supt. Tel. T. R. R. As.	St. Louis, Mo.
L. I. Wells	Supt. Tel. L. I. R. R.	Long Island City.
C. P. Adams	Supt. Tel. Sou. Ry.	Washington, D. C.
T. P. Cook	Gen. Supt. W. U. Tel.	Chicago, Ill.
E. J. Nally	Gen. Supt. Postal Tel.	Chicago, Ill.
T. P. Cummings	Mgr. W. U. Tel.	New Orleans, La.
C. H. Bristol	Gen. Sup. Con. W. U. T.	New York, N. Y.
H. V. Mielly	N. D. T. Co.	New Orleans, La.
W. L. Blair	N. Y. C. & St. L.	Cleveland, Ohio.

I will read the following from our esteemed honorary member, Thomas A. Edison:

Orange, N. J., May 14, 1904.

Charles S. Rhoads, Esq.,
Supt. of Telegraph,
Indianapolis, Ind.

My Dear Rhoads:—Replying to yours of the 5th inst., I beg to state that the last time I attended a meeting of Railway Telegraph Superintendents was at Wilmington, N. C., 96 degrees in the shade. Why does the Convention meet in nearly the hottest month and the hottest city in the United States? Is it to get immune to some future possibilities? I don't think I will go, I am already immune.

Yours truly,
(Signed) Thos. A. Edison.

Orange, N. J., June 11, 1904.

John F. Wallick, Esq.,
Supt. Western Union Teleg. Co.,
Indianapolis, Ind.

Dear Sir:—Replying to yours of the 27th ult., I beg to

state that at the present time I am too busy to attend the Annual Convention of the Telegraph Superintendents, but I am going to St. Louis in October and will then stop off to see the old place once more if I possibly can.

Yours truly,

Thos. A. Edison.

President Rhoads: Can we have the report at this time from the Committee on Topics? Mr. Ryder, as chairman, have you anything to report?

Mr. Ryder: As Chairman of the Committee on Topics, I wish to state that the Committee has labored long and faithfully in its attempt to secure papers for this meeting, and while we will not have as many as at some of the past meetings, the lack in numbers is more than made up in character, and I earnestly hope each one will receive the careful consideration and thorough discussion it merits.

I do not, however, feel to pass the matter without reminding the members of the Association that its life depends largely upon the work done at these meetings, and the furnishing of papers is an absolutely necessary incidental. We all appreciate the fact that the Superintendent of Telegraph is a tremendously over-burdened personage, and that he absolutely has no time for the preparation of anything at all worthy of the members' consideration, etc., etc. But for ability to furnish excuses, I think the body has no equal—if any one in the future is in need of an excuse for not preparing a paper for any Association, I think I can furnish from those recently received by your Committee, that will fit any forcible contingency and that will be warranted not to rip, ravel, or "run down at the heel." I shall, of course, expect to save the choicest ones for my own personal use, but I will without question have enough left to go around.

The papers that have been secured are as follows:

(1) "Use of the Telephone," by A. G. Francis, of the Chicago Telephone Company.

(2) "The Economical Use of the Commercial Telegraph by Holders of Franks Issued on Account of Railroad Contracts," by F. C. Sherman, of the C. R. R. of N. J.

(3) "The Telegraph Operator in the Railroad Service," by J. B. Taltavall, of the Telegraph Age.

(4) "The Use of Modern Telephones as Applied to Railroads," by Mr. Kaizer, of the A. T. & T. Co., formerly of the N. Y. H. & H. Ry.

(5) "The Typewriting Telegraph," by L. S. Wells, of the Long Island Ry.

(6) "Low Insulation of Telegraph Wires in Vicinity of San Francisco on Account of Salt Fogs," by A. E. Roome.

(7) Paper on "Recent Improvements in Wireless Telegraphy," by Wm. Marer, Jr.

President Rhoads: Gentlemen, you have heard the report of the Chairman of the Topics Committee. While he seems to lament the fact that he has not accomplished much, I think that he has accomplished quite a good service in getting us what he has, and no doubt the meeting will get much benefit out of the papers which are to be read and also from discussing them. What is your pleasure in regard to this report? If there is nothing to the contrary, the report will be received and we will take up the papers in the order in which their titles were read, for discussing, further in our sessions.

Secretary Drew: Mr. Chairman, we want to get lunch and be at the monument at half past 1 o'clock, so as to be ready for the 2 o'clock trip, and I suggest that we adjourn now to meet at 4:30 to take up the papers. Mr. Francis' paper is first on the list.

Motion made, seconded and carried.

President Rhoads: The meeting stands adjourned until 4:30.

SECOND SESSION.

Afternoon, June 15th.

At 4:30, the President again called the meeting to order.

President Rhoads: Well, gentlemen, let us come to order so that we can get down to the discussion of some of these papers. In the meantime, I think there is a telegram or two from absentees.

Secretary Drew: Reading telegrams from C. F. Annett and Mr. and Mrs. William A. Porteous.

President Rhoads: The Chairman of the Topics Committee having read the list at the forenoon session, of the papers that are pending, the next in order will be the reading of the first paper on the list, by Mr. Francis.

Mr. A. G. Francis: Mr. Chairman and Gentlemen—"The Use of the Telephone Among Railways."

The telephone is one of the great institutions and conveniences of modern life. We use it, we cuss it, we complain, we grumble, but after all how could we get along without it. Business negotiations of great moment are carried on by this means of communication and when this is done men realize and speak of its value.

There is a much more valuable side. In cases of petty business we can transact in a minute what without it would consume half an hour, or again we do in five minutes what would otherwise take an afternoon; in appointments, we accomplish with a few calls what it would take hours otherwise to do.

For convenience, let us discuss the question by dividing the subject into the following heads:

A. Economy.
   1. Direct exchange line.
   2. Private Branch Exchange.
   Short private line or pony line.

B. Development.
   1. The growth during the past five years in Chicago.

2. The growth in the country at large.

Economy.

A Direct Exchange Line.

When a man starts in business, one of his first thoughts is to be able to reach the public, and to have the public reach him quickly and easily. The installing of a telephone at a comparatively trivial expense accomplishes this and saves additional help and a great deal of time. A railway man communicates with his officials and employes as well as with the public. A careful study has shown that a large percentage of his business is with his own people.

The Private Branch Exchange.

When we find that a railway company has a number of direct lines for its telephone business, it is time to consider a branch exchange system. The advantages of the branch exchange system to the railway corporations are many as regards the general telephone service. This service is made available at all times and many points, and time is saved to those who make use of it. This works both ways because all incoming calls are first received at the switchboard, where they may be distributed directly to the person or department wanted, thus saving a great drag on the service caused by holding the lines while sending for the papers or person wanted. By proper calculation of the trunk lines between the private branch exchange switchboard and the central office required to carry the traffic the report of busy to incoming calls seldom if ever need be heard.

The private branch exchange also acts as an intercommunicating system between the various departments, putting the heads of departments readily into communication with any desired associate or employe.

The increased capacity and flexibility of the telephone service attained by the use of the branch exchange system in a railway office is found by those who have had sufficient

experience to appreciate its working, to be worth far more than its cost. The cost of installing such a system is frequently governed by the mileage of the various station circuits. When a railway company has a general office and headquarters in the heart of a city, and its stations and terminals are several miles away from that building, it is frequently an economy to put in two private branch exchanges and connect them by trunks.

Pony Lines.

These lines are placed principally along yards, connecting various places like the round-house, freight yards, switchtenders' shanties, etc. In an isolated village these may be of advantage, but when a railway company has a private branch exchange these should invariably be connected into the exchange. It gives them the advantage of communicating with any department that may be interested in the work at that point. Thereby again saving time, which is the important factor in all railway service.

Development.

In the City of Chicago, five years ago, railway offices, general and freight, were almost wholly served by grounded lines. At that time there were scarcely a dozen private branch exchange systems in operation. The ticket offices and freight depots were for the most part equipped with single exchange lines, consequently traffic was so congested as to make complaints of inability to get into communication with these different departments a constant occurrence. The facilities of the few offices which had private branch exchange systems were utterly inadequate to handle their traffic.

There has been a steady and carefully economical growth which will be seen by the following figures:

January 1st, 1904, Railway switchboards 47.

Trunk lines connecting these switchboard with telephone central exchange, 322.

Stations connected with these switchboards, 1403.

beg simply to thank you and accept your hospitality with gratefulness.

President Rhoads: The chair would entertain a motion to adjourn for five minutes to afford a word of personal greeting to the Mayor.

Motion made, seconded and carried.

President Rhoads: The meeting stands adjourned for five minutes.

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President Rhoads: The Chairman of the Entertainment Committee, Mr. Maiden, has something to say before the ladies leave us, in regard to the entertainment.

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C. A. Parker	D. N. W. & P	Denver, Colo.
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Wm. Kline	L. S. & M. S	Toledo, O.
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Secretary Drew: These are all of the names of active members that I have received and if there are any others who wish to apply at this time, I should be glad to have their names.

I have also the names of five associate members.

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	C. Adams-Randall	New York, N. Y.
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J. H. Bunnell Co	J. J. Ghegan	New York, N. Y.

President Rhoads: Are there any other names?

Secretary Drew: If there are no other names, I move you, Mr. President, that these members be declared active or associate members of the Association.

Seconded and carried.

Mr. Lang: I move that the name of John F. Wallick be added to our honorary list.

Seconded and carried.

I move that the name of Mr. F. E. Clary be also added to our honorary list.

President Rhoads: It is my recollection that his name is already on the honorary list.

Secretary Drew: F. E. Clary is now an honorary member.

Mr. William: Mr. President, I notice an omission in the printed list of honorary members. Mr. J. M. Stephens was elected an honorary member, but his name does not appear in the printed list. Look at page 24.

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Mr. Selden: I move that the honorary members' list be increased by the name of Mr. Charles Darlton, of the Southern Railway.

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President Rhoads: Gentlemen, you have heard the report of the treasurer, what will you do with it? What is your pleasure?

Motion to accept made, seconded and carried.

President Rhoads: It is safe to say that our treasurer would not go to Canada just at present on account of the surplus in the treasury.

A Voice: He makes a better showing than some of the railroads that hold over items in order to report a balance.

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T. P. Cummings	Mgr. W. U. Tel.	New Orleans, La.
C. H. Bristol	Gen. Sup. Con. W. U. T.	New York, N. Y.
H. V. Mielly	N. D. T. Co.	New Orleans, La.
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Orange, N. J., May 14, 1904.

Charles S. Rhoads, Esq.,
Supt. of Telegraph,
Indianapolis, Ind.

My Dear Rhoads:—Replying to yours of the 5th inst., I beg to state that the last time I attended a meeting of Railway Telegraph Superintendents was at Wilmington, N. C., 96 degrees in the shade. Why does the Convention meet in nearly the hottest month and the hottest city in the United States? Is it to get immune to some future possibilities? I don't think I will go, I am already immune.

Yours truly,
(Signed) Thos. A. Edison.

Orange, N. J., June 11, 1904.

John F. Wallick, Esq.,
Supt. Western Union Teleg. Co.,
Indianapolis, Ind.

Dear Sir:—Replying to yours of the 27th ult., I beg to

state that at the present time I am too busy to attend the Annual Convention of the Telegraph Superintendents, but I am going to St. Louis in October and will then stop off to see the old place once more if I possibly can.

Yours truly,

Thos. A. Edison.

President Rhoads: Can we have the report at this time from the Committee on Topics? Mr. Ryder, as chairman, have you anything to report?

Mr. Ryder: As Chairman of the Committee on Topics, I wish to state that the Committee has labored long and faithfully in its attempt to secure papers for this meeting, and while we will not have as many as at some of the past meetings, the lack in numbers is more than made up in character, and I earnestly hope each one will receive the careful consideration and thorough discussion it merits.

I do not, however, feel to pass the matter without reminding the members of the Association that its life depends largely upon the work done at these meetings, and the furnishing of papers is an absolutely necessary incidental. We all appreciate the fact that the Superintendent of Telegraph is a tremendously over-burdened personage, and that he absolutely has no time for the preparation of anything at all worthy of the members' consideration, etc., etc. But for ability to furnish excuses, I think the body has no equal—if any one in the future is in need of an excuse for not preparing a paper for any Association, I think I can furnish from those recently received by your Committee, that will fit any forcible contingency and that will be warranted not to rip, ravel, or "run down at the heel." I shall, of course, expect to save the choicest ones for my own personal use, but I will without question have enough left to go around.

The papers that have been secured are as follows:

(1) "Use of the Telephone," by A. G. Francis, of the Chicago Telephone Company.

(2) "The Economical Use of the Commercial Telegraph by Holders of Franks Issued on Account of Railroad Contracts," by F. C. Sherman, of the C. R. R. of N. J.

(3) "The Telegraph Operator in the Railroad Service," by J. B. Taltavall, of the Telegraph Age.

(4) "The Use of Modern Telephones as Applied to Railroads," by Mr. Kaizer, of the A. T. & T. Co., formerly of the N. Y. H. & H. Ry.

(5) "The Typewriting Telegraph," by L. S. Wells, of the Long Island Ry.

(6) "Low Insulation of Telegraph Wires in Vicinity of San Francisco on Account of Salt Fogs," by A. E. Roome.

(7) Paper on "Recent Improvements in Wireless Telegraphy," by Wm. Marer, Jr.

President Rhoads: Gentlemen, you have heard the report of the Chairman of the Topics Committee. While he seems to lament the fact that he has not accomplished much, I think that he has accomplished quite a good service in getting us what he has, and no doubt the meeting will get much benefit out of the papers which are to be read and also from discussing them. What is your pleasure in regard to this report? If there is nothing to the contrary, the report will be received and we will take up the papers in the order in which their titles were read, for discussing, further in our sessions.

Secretary Drew: Mr. Chairman, we want to get lunch and be at the monument at half past 1 o'clock, so as to be ready for the 2 o'clock trip, and I suggest that we adjourn now to meet at 4:30 to take up the papers. Mr. Francis' paper is first on the list.

Motion made, seconded and carried.

President Rhoads: The meeting stands adjourned until 4:30.

SECOND SESSION.

Afternoon, June 15th.

At 4:30, the President again called the meeting to order.

President Rhoads: Well, gentlemen, let us come to order so that we can get down to the discussion of some of these papers. In the meantime, I think there is a telegram or two from absentees.

Secretary Drew: Reading telegrams from C. F. Annett and Mr. and Mrs. William A. Porteous.

President Rhoads: The Chairman of the Topics Committee having read the list at the forenoon session, of the papers that are pending, the next in order will be the reading of the first paper on the list, by Mr. Francis.

Mr. A. G. Francis: Mr. Chairman and Gentlemen—"The Use of the Telephone Among Railways."

The telephone is one of the great institutions and conveniences of modern life. We use it, we cuss it, we complain, we grumble, but after all how could we get along without it. Business negotiations of great moment are carried on by this means of communication and when this is done men realize and speak of its value.

There is a much more valuable side. In cases of petty business we can transact in a minute what without it would consume half an hour, or again we do in five minutes what would otherwise take an afternoon; in appointments, we accomplish with a few calls what it would take hours otherwise to do.

For convenience, let us discuss the question by dividing the subject into the following heads:

A. Economy.
   1. Direct exchange line.
   2. Private Branch Exchange.
   Short private line or pony line.

B. Development.
   1. The growth during the past five years in Chicago.

one of the younger members, I must furnish part of the fuel with which to keep the fire burning at the Convention.

No doubt the Committee was familiar with and had the Indiana June weather in mind when they made the decision.

The Chairman also informed me that I would not be permitted to decline on the plea that I was too busy, and further added, that no excuse whatever would be taken. He is, therefore, responsible for this infliction upon you to-day. It does not necessarily follow, however, that because I am new that what I shall present here to-day will be new. It is more than probable that the subject which I have chosen has been threshed over a great many times, so that the most I can hope for is that it may be new to some of the younger members like myself.

I have chosen the subject, "Economy in the Use of the Commercial Telegraph," because it has received a considerable portion of my attention during my incumbency as Superintendent of the Central Rairoad of New Jersey.

I suspect, as I said before, that many of the gentlemen at this Convention have listened to numerous papers and discussions upon this subject during the life of this Association; and that, therefore, an account of what I have been able to accomplish along these lines will be of little interest, but I shall proceed to give it to you for what it is worth.

The Telegraph Department of a railroad is not, as a rule, much of a revenue earning department, being more for the purpose of furnishing facilities for other departments to do business with, than to bring in revenue itself. I doubt very much if there is a road here represented to-day that can show earnings on the part of the Telegraph Department equal to the charges made against it. If there is, all I have to say is that they must have a different system of bookkeeping than has the railroad I represent. The above being true, about all there is left for us to do to make a showing is to furnish the best possible facilities with the least possible outlay, and keep the debit and credit sides of the ledger

from getting too far apart in the wrong direction. One way to assist in accomplishing this, is to always be on the alert and practice as well as induce others to practice, as much economy in the use of the commercial telegraph and telephone as is consistent with the business requirements of the Company.

This is the feature I am going to confine myself to to-day, calling your attention to some of the means I have employed to accomplish it.

Many and, I believe, most roads over which commercial telegraph companies operate, have a certain amount of telegraphing allotted to them, by virtue of a contract existing between them and the Telegraph Company operating the wires, as a consideration for certain concessions made them by the Railroad Company.

Franks are issued to the various officials and employees of the Railroad Company at the request of the proper authority, which, so far as any stipulation upon the frank itself is concerned, entitles the holder to send, free and without limit as to the number or length, telegrams over the lines of the Telegraph Company throughout the United States.

My experience has been, that nearly all frank holders have been laboring under the erroneous impression that they were entitled to use, by virtue of these franks, the commercial wires to any extent they chose, without expense to the road employing them. Holding this view they could hardly be expected to exercise the same regard for economy, in the number of messages or the length of same, that they would were they informed as to the true facts in the case.

Not only are a great many unnecessary messages sent in connection with the Company's business, (many of them being unnecessarily long, the same brevity that an economical business man would practice, who pays for his telegraphing, being entirely disregarded), but a large number are sent on purely personal business, couched into such language that it is impossible for the operator to positively detect them

from legitimate railroad business. I have known four or five dollars' worth of telegrams to be sent concerning a small shipment of freight, the charges on which did not amount to over twenty-five cents, and the entire value of the goods did not equal the cost of the messages sent in regard to them. Another abuse of the frank privilege is the use of them to send communications to points accessible by the railroad wires, which is usually done through ignorance of the possible cost to the Company at the end of the year when a reckoning is made.

An agent of one of the departments of our road once remarked to me, that he was sending most of his business over commercial lines, even to points reached by our own wires, giving as an excuse that he thought they would be handled more promptly than over railroad wires, a claim that no Superintendent of Telegraph would care to admit was a fact. When I suggested that it would not look very well for his office when the report came out at the end of the year, he was surprised, and admitted that he had no idea that a record was being kept by the Railroad Company, or that he was incurring any expense for the Railroad Company by so doing, and decided then and there, that the railroad wires would answer his purpose in the future, and I might add, that he has never found it necessary to enter a complaint of delay since.

There are several ways to assist in keeping this expense down to a point near the actual requirements of the Company.

In the first place, get your General Manager or other proper official interested, and enlist his aid. This will not be difficult to accomplish if a large bill for excess telegraphing has been presented for payment; induce him to inform each and every frank holder that an excessive use of his frank means expense to the Company, or in other words, that the franks are more in the nature of letters of credit, authorizing operators to send their messages charging the

amounts to their Company, than in the nature of free telegraph passes.

After this is done, make out reports annually showing amounts chargeable to each department, so that they will understand that a record is being kept that will enable the management to ascertain who the extravagant parties are. This will, or ought to, place the heads of the different departments on their guard and cause them not only to caution their subordinates, but will in many cases be the means of their placing a censorship on all telegrams leaving their offices and a decided decrease will be noticed immediately, for a large number of unimportant communications will be sent by mail instead of the telegraph.

After all has been accomplished that can be by the foregoing, and the result is not yet satisfactory, secure from the Telegraph Company each month the free business handled, have it gone over carefully, make copies of such messages as appear to be unnecessary or unnecessarily long, refer them to the sender, point out how they might have been sent by mail or how they might have been abbreviated without detriment to their meaning, and you will be surprised at the saving that can be effected in this way. A large number can be cut down, even as much as fifty per cent. and still convey the intelligence desired.

Their attention should also be called to each and every message sent over commercial wires that could as well have been sent over railroad wires without check.

Many men are sensitive about such matters, and, therefore, this should be done diplomatically. It should be taken up in such a manner that it will not appear in the nature of a criticism of their work, but more a disposition on the part of the Telegraph Department to assist the party at fault to make a better showing in the annual report, and, therefore, avoid criticism from the Management.

If this is handled properly, while some opposition may be experienced at first, ultimately the hearty co-operation

of most frank holders will be obtained, and a nice decrease in the expense of the Telegraph and Telephone Department will be the result, if in fact, the entire item of excess telegraph charges is not eliminated.

After having paid large bills for this kind of service, for two consecutive years, we adopted these methods at the beginning of the second quarter in 1903, and during the remaining nine months were able to reduce what bid fair to be a larger excesss than ever, to no excess at all, with a constantly increasing business on the road.

I understand that the American Railway Association has been for some time working on a standard railway cipher code, which when completed, I hope will be one that will appeal to every railroad manager so that it will be universally adopted and enable us to still further curtail the use of commercial wires, and in addition reduce the burden on our railroad wires.

In the supervision of the telephone, I have adopted much the same methods, keeping an accurate account of calls made by each department, and the tolls thereon and rendering a monthly report thereof to the General Manager, who in turn calls the attention of those persons against whom an extraordinarily large amount is shown. The result has been equally as satisfactory as that of the telegraph.

We all recognize the fact that no railroad can be run without expenditures, that we must have facilities with which to do business promptly to operate a road successfully, that the telegraph and telephone pay no unimportant part in this operation; in fact, are indispensable in these days of progress and competition, and the judicious use of them should be encouraged, but the reckless and unnecessary use condemned.

DISCUSSION.

President Rhoads: Gentlemen, any remarks on the paper just read? I imagine that most of us have had the same experience that he has had and we can figure numerous

unnecessary telegrams that were turned over to the Western Union, and those that were necessary frequently contained about one-third more words than would convey the same meaning.

Mr. I. N. Miller: I am afraid that if you carry out the suggestion of this paper thoroughly, some of our excess bills would not be rendered. I believe the suggestion there is the best one that I have known of. Have your bills rendered every month accompanied by the regular telegrams. I think the worst trouble we have is where there are many using the franks,—clerks for instance. I know of an office where they send up each day about 50 telegrams and I have looked over them myself and nine out of ten of these telegrams could have been mailed in the shape of letters just as well as telegraphed. They send them up to us in the evening; it is too late to reach the parties that day, consequently those fifty messages are nearly all unnecessary. They might just as well have been sent by mail.

I have seen a great many circulars issued by railroad companies, but there is only one way to do it and that is to get right after the fellows that are paying no attention to the matter and you will find that they are largely clerks. There is a very large volume of that business that could go just as quickly by United States mail; I think they send them that way because they are in a hurry to close up. Fifty telegrams a night from one railroad office is a good many. I think you can get only half rates on it anyhow. The suggestions in that paper are in the right direction, to get your reports at the end of each month and have somebody look them over, if possible every month. Wherever you find that an officer is sending a large number of unnecessary telegrams, get right after him and the chances are that you can cut all of the excess telegrams out. I think you can all do that, particularly if you get after it energetically and follow it up. This plan of issuing a circular once a year may have a little effect the first month, but they soon drift into the old habits again.

Mr. Ryder: I would like to ask if the telegraph companies are going to raise any objections to furnishing these statements monthly?

Mr. Miller: I think the authorities decided that they would rather render the bills at the end of the year. But we are furnishing a number of roads with these monthly statements. I think that all the trunk lines can get their reports at the end of each month. I believe that Superintendent Rhoads gets his that way and a number of other roads the same. If you want it that way you can get it.

Mr. Ryder: I want to testify to the efficacy of the cipher code in reducing these excess telegraph bills. The Burlington road several years ago were having excess bills (unnecessary) and a cipher code was devised for the use of the passenger, freight and car service departments, and these excess bills dropped out of sight absolutely as a result.

Mr. Hope: I would like to ask if you furnished the Western Union Telegraph Company with a copy of the code?

Mr. Ryder: No, they do not. I would like to ask what brought out this question? (Laughter.)

Mr. Hope: Well, it has been my understanding that some railroads,—that some passenger departments,—try to avoid getting into this trouble, and they take up the code where they can beat the Western Union Telegraph Company by having tickets issued and furnished up to five or ten dollars in money, for ordering Pullman berths at the expense of the Western Union Telegraph Company. I have known two occasions where the telegraph company rendered bills for handling. These bills would be about six or eight months old. I understand that the telegraph company cannot give us copies of these messages sooner than six or eight months.

With reference to Mr. Sherman's paper: Our management has issued a circular for the last eight or ten years. I have got up our service list and our general manager has

issued the circular each year, after the experience that we have had. Messages that our traffic department sends, ordering freight shipments; messages that our contracting agent sends; messages that our passenger agents send, wiring to order the reservation of certain car space, and wiring to Philadelphia to furnish John Jones, at a certain street, a ticket through to destination and five dollars in money, or seventeen dollars in money, or whatever it may be, dead head, account of frank,—these take thirty or forty words,—when such messages come back with the bills, they are referred thus to the head of that department to be certified and to know if he wishes us to voucher them. I think I can go before the approving officer and show what I have done. We have cut our telegraphing down from as high as seven thousand dollars a year and we still keep inside of the limit, and we don't expect the Western Union Telegraph Company to be at the expense of handling the surplus messages on account of some clerk misusing the frank. It is rather hard work to handle the monthly statement, harder than if you wait to the end of the year. With us, we have sifted out where we have run over two or three thousand dollars.

I think that a letter from the general manager to holders of the franks, telling them why these franks are issued, what for, and then if there is any bill rendered, it is to be presented to the head of the department to be certified, is a good plan. It gives him an opportunity to discipline the frank holders under him. The superintendent of telegraph has that opportunity. And another thing, is that I think the circular letter has a disciplining influence on all the messages.

Mr. Selden: Mr. President, for a number of years I have sent out with great glee the circular signed by the general manager. I found that they were effective in some instances for fifteen days, in some others, for about fifteen minutes. We have a telegraph censor. Every single mes-

sage that is sent under a Western Union frank is taken in duplicate, and every week every one of these messages is in my office. Each message is taken up and a blue pencil mark goes underneath such words that were useless to be put in, with a notation on the back that it costs so much money for those useless words. In that way you get the messages and send them back every week with those corrections. Once a month we give the vice-president a statement showing what the bill of each holder of a frank amounts to in its total. The result is that the vice-president is the gentleman who takes it up with those people, and we have reduced our accounts very, very largely.

I think, still, that the railroads lose more money by useless telegraphing on local wires than by useless commercial telegraphing. I am satisfied that if you will go into any superintendent's headquarters you will find that possibly twenty-five per cent. of the messages that they receive or send had better have been sent by train mail. They use the telegraph on the railroads because it is a convenience. It is easier to do. The result is that you load up your local lines, acting on the theory that because John Smith is agent at A and John Jones is agent at C, you pay them anyway and it does not cost any more. Just the same you have kept operators waiting that want to get in and can't on account of this useless stuff that is in between. I think the service would be benefitted largely if you would look not only at the commercial side, but at the railroad side. Go right to the division superintendent and ask him if he thinks it was really necessary to have sent that message to send a lamp chimney for engine so-and-so. You will find that you can certainly get along with less messages and you will get to use the train mail for what it was intended.

The censorship, however, will take you out of the old line. But there is a good deal of work in connection with it. It is a big job to go over all the messages, that have been sent by frank in even one month, but we do it, and it pays us.

Mr. Miller: Mr. Chairman, there is one question I would like to ask. We have had trouble for a great many years with one particular class of messages, and they do not seem to be able to correct it, and that trouble is where the railroad company receives messages from business offices, which are sent as collect, and invariably they say, "Dead head it." I don't see why they can't check it "D. H. Answer." I presume there are a dozen railroad offices in Cincinnati where they don't accept messages checked "D. H. Answer." For some reason or other railroad offices do not seem to be able to control that question. They will do as we suggest, send the answer to our office year after year when they want to file the answer. It seems strange to me that they can't correct that, and they submit to a greater inconvenience in being compelled to submit the messages that they want an answer to. We have to take up each of these messages. This is a great deal of work, and it is something of a mystery to me why the railroad companies do not correct it.

Mr. Selden: A paid message sent to a railroad office should be answered, collect, but they won't do it. The instance Mr. Miller speaks of is wrong and should not be allowed. If the message is sent from one of our offices making inquiries in regard to railroad business, they do not send the answer collect, they send it covered by their frank. The railroad companies have for years been paying for excess telegrams made by that class of business.

Mr. Miller: Mr. Chairman, I took the matter up lately about having these messages sent back to them. They invariably come back with the endorsement on the envelope, written by some clerk, "charge account frank." Some of them were just sent to friends and I am satisfied that it was imposing on the railroad company to charge them to their frank. It was private business. I wrote a personal note to the general manager and enclosed that and showed him what some clerk had asked us to do and that we recommended that that was a hardship on the railroad company and told

him that we had a way of helping railroad companies out and that we had taken the matter up with the man that sent the original message, that by contract with the railroad company, messages sent by a private individual, even if he was a railroad official, could not be franked and we would call upon him to pay the charges. The telegraph people have said that these messages are not properly free and we cannot pass them that way. I made that suggestion to a general manager and he said, "That's exactly right. This message ought to be paid for by the sender. When they are trying to send them that way, simply say, 'The message is not free under the contract that we have with the railroad company, we will have to charge it.'" He pays the tolls and that relieves the railroad company.

Secretary Drew: What would you do if the message was sent collect?

Mr. Miller: Let the railroad officer refuse it.

Secretary Drew: They would not do it. They would send it down to the superintendent of telegraph and say, "Put that on our account."

Mr. Hope: Changing the reading of the frank might affect the endorsement of the Western Union Company. But one thing, where railroad companies are imposed upon, and that is,—John Jones, 50 or 100 miles away from St. Paul, will wire, "Reserve lower Chicago and wire number, Answer." If he had left off that "answer" or "wire number" at the bottom, it would have saved. We might have to answer it. If we sent that message back, perhaps he would not ride over our line. We find that we cannot expect the Western Union Telegraph Company to stand that expense, therefore we pay them. I do not doubt but what others may work the Western Union Telegraph Company all they can. I think that if the superintendent of the Western Union Telegraph Company would write to some of these officials and give them instructions for the different departments we would all be glad to help. I know messages from outside will come and they send them back "D. H. frank."

President Rhoads: I would just say that the Western Union frank does not state that the telegram is sent free; it says that they will transmit on lines of the telegraph company on account of this frank messages signed by certain persons. It is sent on account of the railroad company under an agreement that at least a majority of the gentlemen that hold them are certainly aware of, that they are not free telegrams.

Mr. Torrey: Do you furnish their offices a copy of the contract?

President Rhoads: We try to have the heads of the departments understand the contract and whenever necessary we furnish them a copy.

Mr. Torrey: Well, they should not bring up the question that it is free.

Mr. Miller: Mr. Chairman, one thing is a little embarrassing. One railroad will say little in regard to these messages ordering sleeping car accommodations and steamer berths. Other roads send these messages D. H. all the time. The fact is that every message is sent back and we render bills at the full tariff rates for every message, and the one railroad company pays in full and expects to pay them in full, but the other roads, seeing that those messages are sent free, it lead them to try the same thing and send them dead head. The fact is that pretty nearly all the trunk line railroads expect to pay for them and do pay for them.

Mr. Selden: The telegraph company is furnished a copy of our cipher code. They can look it over if they want to, but we hold that we have a perfect right to say that we can deliver a ticket to such and such a number in such and such a street, but when it involves the sending of money to pay for that ticket, our Company pays the full commercial rate on that message. They are willing to do that to get the passenger.

President Rhoads: I am sure that we receive these bills every month, especially from our passenger department. We

get quite a number of them that are improperly sent free, and they are charged up to the proper departments, and, as far as I know, they are all paid. No one raises a question as to their not being properly sent .

Mr. Williams: I was just going to state that we require each frank holder to render a statement to the Superintendent of Telegraph each month of each individual message, showing the number of words and value. If we find that he has sent messages from one local point to another local point, he is called on to explain the reason therefor. In addition to this, the Telegraph Company furnishes me with a statement monthly, so that if we are getting dangerously near our free limit, we know it in time to increase our vigilance. By means of these statements, and the exercise of censorship, we were enabled to reduce our free account more than $80,000.00 the first year we put them into practice, and we have lived within our limit since.

We have found that the issue of an annual circular to frank holders did not accomplish the desired result.

Mr. Hope: I would like to ask Brother Williams if they get them from foreign offices?

Mr. Williams: From the President down,—every frank holder. I keep a list of all frank holders in my office, and my clerk checks them; if any are missing, we send out a little card asking for them. They have to explain to me if, for any reason, they use their franks improperly. The sending of a message under frank to any point reached by our local service, is considered improper. We are backed in this by our President.

Mr. Selden: I remember about ten or fifteen years ago, almost every trunk line in the west issued a circular explaining what messages were sent free and what were not free, and taking up the ticket question. I have the most of these circulars on file yet, and they have been of very great value to us. It would be a good plan to re-issue them. They did us the most good of anything we have ever had. They

informed every frankholder what class of messages was free and what was not free.

President Rhoads: In regard to that point, may I say that when our President put that notice out, we had him leave out the date. I have a supply of them, and occasionally, if I find that I have a good case, I enclose in an envelope a copy of the President's circular in regard to that, calling his attention to it, and to the fact that he is liable to have to pay for some of these telegrams.

Mr. Jacoby: Mr. President, I do not wish to prolong this discussion. It has been pretty thoroughly ventilated. Just a few thoughts came to me while the discussion was proceeding, in connection with the methods to be pursued for reducing this evil. We have adopted a system—had it in force for about two years—that has been giving very excellent results. It consists of an inspection of the messages—censorship, to some extent— and a statement every month to the head of each department, giving the amount charged to that department, and also a memorandum to the effect that the account with the Western Union Telegraph Company is still in excess of the free limit. We have succeeded in reducing the excess from five to six thousand dollars a year. On one or two hundred the percentage was about twenty-five, and we have continued that. We take messages that appear to be unduly long, unnecessary words, etc., and underline these words as has been indicated, and send them to the head of the department, and that has had a very excellent effect. We, of course, find a great deal of objection to that on the part of some of the heads of departments and it has to be handled diplomatically, as has been suggested by Mr. Sherman, but if it is properly handled the heads of departments will see the point and will cooperate with you. We have had no difficulty along these lines, but it requires a great deal of work(and unthankful work). It really employs the time of one man about three or four days per month to do the work, but we can afford to

thoroughly take and carry that principle out in ordinary railroad business because we are spending a great deal of money for unnecessary telegraphing. Various methods are being used by different roads, one of them is the red envelope or train telegram. That has a very good effect, and there are other methods, but with it all, the censorship, I believe, is the proper method.

President Rhoads: You have heard a good many good suggestions in regard to what improvements could be made along this line, as the result of this paper. If there is nothing further we will pass to Mr. Taltavall's paper on "The Telegraph Operator in Railroad Service."

Secretary Drew: Mr. Chairman, it is now 6 o'clock and seeing that we have a business meeting at 7:30 and that we have a business meeting to-morrow morning, which is apparently the last and only meeting which we will have after this evening,—now it strikes me that, if we are to have as interesting discussions over the remaining papers as we have had over this, we are not going to get through without being unable to make the excursion around the Belt Line tomorrow afternoon. I would like to hear some expression from some of the members as to what they think. We certainly have a good deal to do in our meetings yet before we can adjourn, and according to the program we have only one and a half hours this evening and about one and a half hours in the morning. We are not going to get through.

Mr. Selden: The Belt Railroad people here have made arrangements for us and have been at considerable trouble, and I do not think that we ought to give them the "go-by" and lose that trip. I do not think it would be treating them right. I think that we ought to meet this evening at 7:30 and work unil we clean up considerable of our work if it takes until half past ten or eleven o'clock. The most of us here would remain up lounging about the hotel and smoking—

President Rhoads: May I break in to say that this evening at 8 o'clock the concert will be given by the band.

Mr. Selden (continuing): I beg leave to say that we know that the ladies love the band and we have been to enough circuses in our lifetime to get along without the band. We will be busy in the morning, and we will not be discourteous enough to turn down the railroad people.

President Rhoads: I was going to suggest that as time is an important feature with us, we have this paper read and continue in session thirty minutes.

Mr. Selden: You will find that half an hour is hardly sufficient. If you make it 7:30, let us adjourn now and you will have a better chance for a full house.

President Rhoads: Is that a motion?

Mr. Selden: Yes, sir.

Motion was seconded and carried.

THIRD SESSION.

Evening, June 15th, 1904.

At 7:30 P. M. the Convention met pursuant to adjournment, President Rhoads in the chair.

President Rhoads: Gentlemen, let us please come to order. The next on the docket of the Secretary is Mr. Taltavall's paper, "The Telegraph Operator in the Railway Service." Mr. Ryder will read the paper for Mr. Taltavall.

THE TELEGRAPH OPERATOR IN THE RAILWAY SERVICE.

By J. B. Taltavall,

Editor, "Telegraph Age."

The lack of a trained understanding in the more important details of his profession on the part of the average telegraph operator, is too often a serious drawback to his true usefulness. A student life in its broadest sense is requisite for the full intellectual development of the telegrapher in his profession. But to this attainment comparatively few aspire, and we are compelled to accept the operator as we find him.

An experience extending over a period of more than twenty-five years of close personal contact, and in dealing with members of the fraternity, both railroad and commercial, has afforded abundant proof that but a very small percentage of telegraph operators possess either the inclination or the necessary perseverance to acquire telegraph and other electrical knowledge through the instrumentality of books. Nevertheless the careful and systematic study of books is a most influential help to the individual whose ambition it is to win success in life, and operators should not fail to make the best possible use of this means of self help to education, reading and re-reading their technical volumes, so that the matter therein treated may become familiar and firmly established in their minds. Still, in the gaining of such knowledge, the fact yet remains that the ordinary telegrapher does not somehow seem able to grasp, at least with a ready and clear perception, the practical application of the technicalities of the subjects thus presented, and that in order to do so it is demonstrated that he requires the further aid of personal explanation and illustration of a given topic imparted to him by some one competent to teach.

This fact leads me to declare my conviction that if a railroad company desires to increase the efficiency of its telegraph staff, it should, as a preliminary move and as a part of its regular discipline, detail some one adequate to enlighten those operators needing information, at least on points of what it is considered especially desirable for them to know. All railroads have in their employ many persons abundantly able to fill the position of such an instructor, and the exercise of such a supervision would work decidedly beneficial results, a commendable economic measure every way considered in railroad telegraph management.

A radical deficiency, the one most common, perhaps, among telegraph operators, is the failure to acquire an understanding of the proper management of the switchboard and an adjustment of relays to suit changing atmospheric

conditions. The importance of a thorough acquaintance in this regard cannot be too strongly impressed upon the mind of the operator. Lack of such knowledge is a serious drawback. As every superintendent will bear witness, there are but comparatively few employees of the telegraph department on any line of railway who are able to make a patch or to test the wires for ordinary faults, such as grounds, crosses or openings; to manage repeaters, and to balance duplex and quadruplex apparatus, now so extensively used on many railroad systems. Four operators in as many different offices on a well known Eastern trunk line were obliged to confess their ignorance a short time ago, as they were called up one after the other, before a man was found sufficiently skilled to make a patch. In another instance a day operator in a certain office understood how to patch, while the night man at the same point was unable to do so. The unequal conditions in the same office was the cause of much annoyance, necessitating the occasional calling of the day man to the office during the night. These examples afford a too common illustration of grave defects respecting requisite technical information on the part of the operator, to remedy which for the benefit of the service, might well become an imperative act on the part of the employing company.

Printed instructions covering all switchboard practice, even when accompanied with blue prints, though of benefit to some, fail frequently in their application to specified stations, to convey a correct understanding to others. Especially is this true if the information be so voluminous and so general in character, too often the case, as to confuse and mystify the individual rather than enlighten him on the particular board regarding which his duties demand he shall have a clear conception. Now, if instructions, instead of being printed and sent to an operator, were rather more often taken to him, and their full meaning made clear by sufficient diagramatic and oral explanation, the standard of

excellence on the part of the individual would soon be in the ascendent, and the company itself would be the gainer thereby.

Text books are all right in their way; their study should be encouraged, for without them much in the course of instruction would be lost, but of necessity the information conveyed by them is general and not specific in character. How much better, than, after an operator had read and reflected over a description of the mechanism of a switchboard, would it be to have some qualified person call upon him, and personally, and by means of a specially drawn diagram, carefully to explain the particular board the operator is expected to handle. There are but few telegraph offices on any line of railroad equipped alike, and as an explanation of, let us say, a twenty strap springjack switchboard is naturally confusing to an operator wishing to learn how to handle an eight strap peg switchboard, the advisability of imparting instruction respecting the difference between the two is obvious.

One superintendent of telegraph informed the writer that on his road few of the operators knew how to adjust the relays properly, a further instance of a want of practical knowledge. It never occurred to many of them, he said, that the magnets could be withdrawn from the armature or placed nearer to it as climatic conditions demanded. The ordinary operator simply regulates his relay adjustment by the spring, letting it go at that, the result being that in wet weather offices furthest apart could not break each other.

A few minutes personal explanation on adjusting relays would do more to lessen the burdens of many train despatchers and others than a month of reading could accomplish. It should be clear, therefore, that the adoption of some plan for the supervisory instruction of its operators in the manner that has been indicated, would go far toward improving the telegraph service of any railroad.

To illustrate the frequent causes of discouragement under which some operators labor, a man stationed at a busy railroad junction not long since informed the writer that he felt impelled to resign his place because he had been given a set of repeaters to handle, the manipulation of which he did not understand. He was, in consequence, in a constant state of worry, and the daily receipt of complaints from his superintendent, from train despatchers and others, reflecting on the inferior repeater service, made life to him a burden. All this might have been obviated, if the person who installed the set of repeaters had been capable of instructing the unfortunate operator on its adjustment and management. Failing in this requisite, and as there was no one within convenient call to whom the operator might appeal for help in his dilemma, the service suffered accordingly. The operator in question did not lack in general intelligence; he was a fairly bright man, but he came short in this instance because a performance with which he was not familiar was unexpectedly thrust upon him. A brief explanation at the outset would probably have removed all embarrassment and in the end the working of the railroad circuit would have become vastly improved.

It should not be inferred by what has been said that the average telegraph operator is generally deficient in an understanding of his profession, for it is not true, even in small stations. As a rule, he is an intelligent, practical man, possessed with a fair all around conception of his duties, and fully alive to the importance of his position. He is not up perhaps in some of the technical aspects of telegraphy, for his opportunities in that direction very likely have been circumscribed, but his fundamental knowledge of the subject is apt to be accurate and comprehensive. To assign him to a new place with strange responsibilities unexpectedly placed upon him, with the expectation that he will correctly perform them, is manifestly unfair. He needs and should receive such instructions as should qualify him to perform

the particular service required, exactly as a new man in any line of business would be instructed. Once given a proper start the operator can be trusted to work out perplexing problems for himself.

Finally, let me say, it is most important that diagrams embodying every piece of telegraph apparatus in all railroad way stations should be clearly drawn and kept permanently for reference in the office in which they are found. Then, in addition, if each operator had the construction of each instrument and the switchboard thoroughly taught to him the efficiency not only of the several offices alone, but of the entire line as well, would be distinctly improved. Diagrams should also be made of the local and main batteries, storage and dynamo systems (if any) and likewise be kept for general inspection. The exercise of a judicious system of instruction in the telegraph service would measurably improve its value and effectiveness and remove many causes for local delay and irritation. It would go a long way toward remedying present shortcomings that certainly need attention.

DISCUSSION.

President Rhoads: You have heard the reading of this paper; it is now open for discussion.

Mr. Camp: Mr. President, I was not in the room to hear the first part of the paper which has been read, but I came in time to hear the latter part of it. Referring to the difficulty in having railway operators understand the work of the switchboards, I might say that on the Canadian Pacific we have recently established a school in Montreal for the joint education of stenographers and telegraph operators. We have put in a system of switches between different stations on the road, so that the operators who pass through that college must become familiar with the practical working of the switches. It is the intention, as far as possible, that operators who have already become operators (if I may use such an expression) shall pass through this course and

undergo an examination. By this means we hope to eliminate one of the sources of the trouble. .Of course, on our system it is a great deal different from what it is on most of the railway systems in America; we operate the commercial telegraph ourselves. The test offices are under the charge of skilled men, but there are one or two places where we have been obliged to install repeaters and we have had something of the same trouble as mentioned in the paper, but we get over this largely on account of our system of inspectors. We have inspectors in the interests of the operators and it is a part of their duties to see that every operator, although he is in the railroad department and the inspector is in the commercial, thoroughly understands his switch and also the adjustment of the relay. Of course we are not bothered so much with the adjustment of the relay in our part of the country because we have very clear air, but by means of this school of inspectors we hope to get rid of a large part of the trouble that we have now.

President Rhoads: Has any other gentleman something to say on the subject or on any of the points mentioned in the paper? We have a gentleman here, I believe, that is president of one of the large telegraph schools of this community, Mr. Dodge, of Valparaiso. We might hear a word from him.

Mr. Dodge: Mr. Chairman, I thank you for the opportunity of addressing you, but I came in a little late and heard only a few words of this paper. But I will say that we make an effort to cover the points the gentleman spoke of. We make an effort to train our people in the construction of lines and circuits, however, the simple lines, and to that end we are quite successful, but not being acquainted with the paper I prefer not to make any remarks.

Mr. Miller: Mr. Chairman, I just want to make a suggestion; I do not know whether it would be a good one or not. That is that trunk lines have cars fitted up with various kinds of machinery to teach employees how to handle

them. Why would it not be a good plan to have on some of these cars switchboards, sets of instruments and the necessary equipment to teach telegraph operators their use, and require a man before he is assigned to regular work as an operator on a railroad system, to come to some headquarters and take such instructions? I don't believe there is one operator in ten, on an average, that can make the necessary switches on an ordinary standard switchboard. If you run, for instance, a broker's loop close on the side there isn't one in ten, in my experience, that can switch that loop into the jack and keep his instrument on at the same time without making a mistake. They are making trouble for us all the time, because the linemen connect these various loops and the operators cannot handle them. If you had something in the way of standard sets, and would not go into quadruplex very extensively, you might have a switchboard that the man in charge of might become thoroughly familiar with; then he could make any switch he might be called upon for in a few minutes. You could also have a regular set of Morse instruments there and when he cuts in your wire, bring around the wire to the switchboard and do it right. Teach him to set and use an ordinary set of Morse instruments, to adjust the relay in a very few minutes, but the most important part, especially to us, would be to know how to handle the switchboard. By practice with one broker's loop, putting in these turn-over switches, all the operator has to do is to turn that switchboard. In that way your wire chief can get accurate tests, but if he undertakes to switch that loop in with pegs he will mix it up for you. I don't see why you could not teach that in one of your cars so that each man would know how to make the necessary switches.

Mr. Selden: The test cars that you have go to the terminals, where there is a number of train men. You cannot send your operators down there to receive your instruction and they could not place the car very well at way stations

to instruct them. You might be able to instruct them at each terminal where your air brake car stopped, but outside of that I do not think that you could. Of course, the proper thing would be for the operator to report to the division headquarters before he is put into a station as an operator, but there are many times when you employ operators and the gentleman in charge of the division may never see them for some little time after that. John Smith comes in; he asks him one or two questions and sets him to work, and he never thinks about that operator again he is so busy running trains.

There was lately published a very fair little bit of a diagram for these new switchboards, showing positions of plugs when they wanted to cross connect one-east or three-west, or something of that kind, and I started to get some of these out, but just about that time they had the cholera, or something of that sort, and they got lost in the shuffle. The difficulty is we cannot get men who do understand the business. Many times we find that the man in charge of the station would not be able to make the changes on any switchboard, but the one he is used to working himself. I think that if we use a system of instruction we could better this condition.

Mr. Camp: I might say that on our commercial wires from Brunswick to Nova Scotia we have a two-circuit main with one, two and four line switches, so as to cut out all the way offices, and we have diagrams showing every plug hole in the switch, so that they could get instructions from the four points to any way office what holes to put the plugs in, but you can hardly get any two offices with the same wires going into the same board in the same manner.

Mr. Jacoby: Mr. President, the question that has been presented is certainly a very important one. Several years ago we proceeded to devise means for overcoming these defects and difficulties. It was about four years ago we inaugurated a plan of systematic instruction of operations in which the diagram referred to played an important part.

However, that was not all the instruction. These diagrams were submitted to the applicant and he was asked to fill out and answer the questions of his accord during the examination. If he could not answer them or if there was a mistake in any portion of his answers, he was given instructions in such a manner as to enable him to fill out not only these cards, but also to have a theoretical knowledge, the idea being to have the operator not only copy by note the thing that he had before him, but to understand the theory involved and to know the whys and the wherefores. For that purpose a switchboard is provided and the operator is shown the switchboard and how to use the perpendicular strips and the horizontal strips, and all the appurtenances of the switchboard until he fully understands it. After he once has a knowledge of it, we find that he can make almost any kind of a connection that you put to him. I have verified this out on the line at different times. We make it a point to inquire of the operator just what he can do. I find that he after an amount of study, can go to the board and make almost any kind of a connection. I venture that nine-tenths of our men know how to make almost any kind of a connection; there are still a few that are not up to the mark, and some of the new men, especially, may not reach it, but that may rest on the fact that those who examine them are not as rigid as they ought to be. However, that is a matter to be taken care of by the employer.

I find that specific instruction along these lines has a very beneficial effect and it seems to me that the whole solution of the matter is in a system of instruction, and upon the operator taking an interest in it, to have him know the nature of electricity and why an instrument works. I know there was a time when the despatchers or chief operators did not know what made an instrument work. We try to give the operator a comprehensive idea of it, not to make him an electrician, but to give him a knowledge so that he can help out in case of necessity. In the past year or two

we have had very little difficulty in making patches. By suitable daily reports every point is shown up in our office,—the time occupied in testing, and clearing trouble, and if there is any undue delay we inquire into it, so that by watching out for these things very carefully we are enabled to clean up regularly any defects and produce a fairly satisfactory service.

Mr. Ryder: It seems to me that the discussion that has taken place here to-night has very clearly exposed the fact that our troubles are not due entirely to the operator, but are, in a measure, due to the apparatus with which he is compelled to work. You will remember that I had a bug last year and some of you do not know whether that bug is still alive or not, but I do believe that what we want is a switchboard that does not take a course of instruction in a first-class college to enable a man to comprehend its manipulation.

President Rhoads: You who were at New Orleans last year recollect the display we had of Mr. Ryder's improvement in switchboards. Some have stated that all we had to do was to put that before Mr. Barclay and if it was better than anything the Western Union had, he would immediately take it up and supply it.

I would like to hear from Mr. Houghton, who is an old telegrapher, as to what he thinks of the points brought out by Mr. Miller in regard to making that part of the air-brake car instruction outfit.

Mr. Houghton (A. G. S.; C. C. C. & St. L. Ry.): I think, Mr. President, that it is as Mr. Selden says,—it would be impracticable on account of the difficulty in getting the operator to go to the car or in getting the car to the operator. It would be a very good thing if it could be got to work.

Mr. Hope: I believe there is another way to educate the operator. We have not had any trouble to speak of for the last two years. Our requirements and passing our ex-

amination include being able to handle the switchboard, making repairs and connections. For some little time we have required the student to pass an examination. We try to have our students brought in about three different times. As we have a large number of them we are compelled to make opportunities, and these students are called on very readily, especially after they have had a little time to talk it over with the operator. Before we consider him competent he must understand the switchboard. We also require our foreman of the line repairers (we have a good foreman on each division) frequently to go to a certain office and drill the operators on the switchboard. If you have a good, first-class lineman, he can do more towards instructing the operators how to handle the switchboard than if you went along on a car and could give them but fifteen or twenty minutes.

Mr. Taltavall: I would like to ask Mr. Ryder in reference to his switchboard that he displayed at the New Orleans meeting last year. I called on Mr. Barclay on my return to New York and explained the merits of the switchboard and he began to look into it and he discovered that some one else had patented the same thing and concluded that he was unable to do anything with it. These switchboards to-day, I believe, are in use in some of the Postal offices of this country. In reference to the remark made by Mr. Selden about the importance of instructing telegraphers, I remember working in Toledo in '75. They put in quadruplex repeaters at that point and they had just come into use at that time, and no one in the office was familiar with the instruments, and Mr. Selden was delegated by the Western Union Telegraph Company to go to Toledo and instruct the operators in the handling of these instruments and the first thing he did was to get all hands together and form a school, and he drilled us there for two or three weeks, and I think every man in the office knew how to install quadruplex repeaters and adjust them. I

think the service in Toledo was a success from the very day it was put in. In all the other offices of the Western Union service at that time, with the exception, possibly, of Buffalo, the quadruplex apparatus was looked upon as a bug-bear and something to be avoided.

Mr. Ryder: I just want one more word in regard to the switchboard. I have tried very hard to keep my name from being associated in any way with that switchboard, not that I am at all averse to being credited with the idea, but it does not belong to me. I stole the idea from the long distance company, and I think I tried to make that clear at the last meeting, that Mr. Skirrow has a patent on that board, where I got that idea which has been copied absolutely in detail and put into the Quincy office of the A. T. & T. Co. in 1893 and has been there every day since. Mr. Skirrow made application for this patent in 1900, and while I am not positive that the statement that this board is an infringement on the A. T. & T. Company's board is true, possibly it may be true, but I have very grave doubts. The illustrations of the Skirrow board show something that is not in the A. T. & T. Company's board,—on the three boards, I think,—and is not essential in any way whatsoever. I am not convinced, either, that the Skirrow patent is a bar to our having something better. I don't say that this board is the only thing, but I think that every gentleman here will agree with me that the present so-called standard switchboard is a pretty tough proposition and we want something better.

Mr. Fowle: It may not be out of place to describe here the type of switchboard which is going into use on one of the large roads. This board employs the standard telephone jack and plug for making connections,—a device familiar to all. For testing and patching purposes two jacks are associated with each line wire. This jack contains a flat spring normally resting on a stationary contact; when a plug is inserted in the jack the tip of the plug makes con-

tact with the spring and lifts it clear of the normal contact. An incoming line is wired to the spring of one jack, the normal contact of this jack is wired to the normal contact of the second jack and the spring of the second jack is wired to the outgoing line. When the board is in normal operation, every through line wire is wired to two test-jacks in the above manner; a terminating wire is connected to one jack only,—or possibly it may be connected to two jacks, the spring contact of the second jack being wired to battery. In patching, cords about three feet long, with a plug on either end, are employed. To patch No. 3 east to No. 7 west, one plug of a patching cord is inserted in the east test-jack on wire No. 3, thus bringing the circuit of No. 3 east through the plug into the cord and opening No. 3 both ways; the other plug on the patching cord is inserted in the west test-jack of wire No. 7, thus opening No. 7 east and completing the connection of No. 3 east to No. 7 west. Beside each jack is a card-holder for receiving a card designating the number and direction of the wire connected thereto. There are usually several spare jacks at the bottom of the jack panel, and these may be wired to ground, for grounding the line wires by means of the patching cords.

For connecting office instruments to line, looping jacks are used. The plug used with this type of jack has an insulated tip and an insulated sleeve over the shank, the two connections from which are brought out to a double conductor cord. The cord passes through a hole in the plug-seat, or receptacle for the plug, then under a cord weight and up to a cord shelf; the two cord terminals are then wired to a set of office instruments, consisting of a main-line relay and key. The looping jack has a metallic bushing which receives the shank of the plug and makes contact with the insulated sleeve thereon; the flat spring rests normally on a stationary contact, the contact being wired to the metal bushing. The insertion of the plug in the jack makes connection between the sleeve of the plug and the

bushing of the jack before the insulated plug-tip lifts the jack-spring clear of its normal contact, thereby providing means for cutting a set of office instruments into a line without opening the line or interrupting communication.

There are, then, at least three jacks associated with each line; four is the best number, arranged with a looping jack either side of the two test jacks, on each line, so that instruments may be cut in either east or west of the test jacks. The jack panel in such a switchboard is vertical, in the face of the board, and has four vertical rows of jacks, with designation cards at the right and left of each pair of test jacks; beyond the designation strips, on each side, is a row of looping jacks. The sets of office instruments are wired to cords and plugs, as just described, and the plugs rest in receptacles in the shelf or key board beneath the jack panel. In case there are telephone circuits in the board, the proper talking and ringing apparatus is provided, wired to cords and plugs, so that the person in charge may talk on any telephone circuit and manipulate the circuits for testing or patching.

The advantages of this type of board over the peg switchboard are: less space, absence of peg connections, fewer operations to make a given change, fewer opportunities to make mistakes, simpler for operators to understand and the use of soldered connections rather than binding-post connections. The peg-switchboard often depends solely on the ground-plate for protection from lightning. When the board described is employed, it is necessary to use some form of lightning arrester exterior to the board. The arresters should be arranged in a group, as near the entrance of the wires to the building as possible, in order to protect the office wiring as well as the switchboard. The best practice consists of an air gap from line to ground and a fuse in series with the line.

Mr. Ryder: Mr. Fowle has described absolutely in detail the so-called Ryder switchboard.

Mr. Lang: Mr. President, I have listened with a great deal of interest to the discussion on instructing operators in handling switchboards. We have failed to evolve a single practical idea from the discussion beyond what we knew more years ago than I like to acknowledge. Many years ago, when I had charge of the employment, selection and instruction of operators, it was my plan to bring every operator to my office before employing him and give him instruction in making patches on the switchboard, cutting in and cutting out, transferring the instruments from one line to another, setting up and taking down again a set of instruments. Is there anything that has been done in the last forty years that beats that? In those days I had immediate charge of operators and could do it. Many a man that worked for me has reached eminence in railroad or electrical circles. Mr. Barclay himself was one of my operators and got his instruction from me. I believe that if our chief operators could be instructed first, and then take every operator into our office before we employ him, we would have men that understood these things thoroughly and could do what might be required of them.

Secretary Drew: Mr. Chairman, if this discussion is closed, I have a little matter that I would like to bring before the Association.

In 1885, I think, a gentleman who is present, joined our Association. He was with us, I think, for the last meeting time, in Denver, in '92. In those days we were not quite as careful as we are now to recognize our retiring members and in some way his name did not get on the honorary list. I move you that Mr. H. F. Houghton be made an honorary member.

Motion seconded and carried.

Mr. Houghton: I thank the Association.

Secretary Drew: We have another old-timer here with us, one of the very few presiding officers that we had with our Association way back in 1882. We have not seen him for a good while. I was not present at that meeting myself,

but Mr. Kline was there. I would like to hear from him.

Mr. Kline: What the speaker has said is actually so. There have been a great many of the gentlemen connected with the Association at that time who have passed beyond; a great many have grown up—have got higher in railroad lines. I recollect the first meeting we had. There was merely a handful of members at that time. The whole thing has drifted away from me, friends, entirely; but I have learned about your proceedings and what has been accomplished. I am very glad to meet all of the old-timers and also the new ones.

President Rhoads: We will proceed to the next paper. The next paper is "The Use of the Modern Telephone as Applied to Railroads," by Mr. Kaiser of the A. T. & T. Company, formerly of the New York, New Haven and Hartford Railroad.

THE USE OF THE MODERN TELEPHONE AS APPLIED TO RAILROADS.

By B. A. Kaiser.

(Read by Mr. Fill.)

With the increased growth of passenger and freight traffic and the necessary complicated methods of handling numberless trains, comes the necessity for quick transmission of orders regarding the receiving and despatching of same.

No one thing has made this more possible, or has reduced the danger of accident to a minimum, so much as the perfected telephone system now in use on many of the larger railroads.

In no one direction has there been more advancement than in the use of the telephone, and-today it has passed the point of a commodity and is almost an absolute necessity whenever there is a need of a facility for the immediate transmission of orders.

Its first use in connection with railroads was simply to accommodate the public, giving the hour of departure and

arrival of trains, only being associated with the commercial end of the business. But to-day it not only enters into the commercial field, but plays an important part in the operating department.

Before it was possible for a railroad company to install for its own use a private branch exchange, it was necessary for it to procure from a local company a required amount of exchange service, giving it practically none and certainly very slow intercommunication between its own offices, all of its intercommunicating calls being handled by the public exchange operator, who could show no partiality in the handling of her traffic.

To-day, with modern equipment and by the use of its own private branch exchange, the railroad company can secure from its own system, local, long distance and intercommunicating calls between its several offices.

It is an interesting matter to note the growth of the telephone upon one of the modern railroads from which we have been able to secure figures of unquestionable accuracy. On February 1, 1894, the New York, New Haven and Hartford Railroad Company used in the conduct of its business at New Haven, Connecticut, three direct exchange telephones and one circuit known as "yard circuit," with six telephones thereon. Grand Central Station had but one telephone and this was used by the officials as well as being used for reservation of parlor and sleeping cars. Harlem River Station, a point which handled upward to two thousand cars in twenty-four hours, had but one telephone direct to the exchange and a short line connecting eight of the most important points throughout the yard.

Piers 18, 19 and 36 North River had direct exchange service. Pier 50 East River had one telephone with direct exchange service. Providence, R. I., had a few direct exchange service lines and three short lines through the yards. New London, Conn., had one telephone with exchange service at its freight house. Boston had a few exchange lines

in the Old Park Square Station and the South Boston freight terminals were practially in the same condition regarding telephone service.

With this inadequate telephone service at the various points on the New York, New Haven and Hartford Railroad, it was necessary for the railroad company to employ messengers at the various points to carry messages to the different departments as well as run to and fro with car records and telegrams through its numerous yards and offices, all of which caused some delay in switching and movements of trains as well as the endangering of life.

On February 1, 1904, this Railroad Company had felt the necessity of increased facilities and had installed on its system fifteen hundred telephones besides a number of private branch exchanges and also its own metallic circuits for communication between its various cities.

These telephones are being put to the following uses: Direct communication with the public from the different offices of the Railroad Company; immediate communication between the officials, heads of departments and the numerous other employees of the Railroad Company.

By the use of its own private branch exchange, matters of a confidential nature can be talked about with perfect privacy, as the circuits used for this do not extend beyond its own building, saving unlimited correspondence, which heretofore has always been necessary.

Its use in the operating department for direct and immediate communication between the stationmaster, yardmaster, towers and switch cabins, in connection with the making up of trains, handling of car numbers and saving the time of freight conductors in many ways in the making up of trains.

It also gives the station and yardmasters quick communication with the engine house and enables them to secure additional power when needed, all of which saves money and time for the railroad company.

Blind sidings being operated without telephones were a menace to life and limb and often resulted in the destruction of railroad property, it being almost impossible to arrange signals as to the movement of trains upon this class of track.

With the use of the telephone, danger of collision is reduced to a minimum, it being possible to notify the proper parties as to the movements to be made.

At large terminals, such as Boston, Providence, New London, New Haven and Harlem River, where there are thousands of movements each day, the telephone is invaluable, because by no other method could the trains be handled so easily, so safely or with so much rapidity as by the use of the telephone.

It enables the one in charge to be in immediate connection with every point of his terminal and orders are given and executed with a rapidity that could not be done by any other method.

It has been proven that by generously supplying all offices with telephones, that the railroad company are able to save men, as the clerks do not have any excuse to leave their work for any information they may need from some other office or yard.

Foremen are able to take charge of more work by its use, while yardmasters, roadmasters and despatchers claim they could not do the work which they are at times called upon to do without the telephone.

There is no railroad more able to handle a disaster than the one equipped with metallic circuits giving immediate communication from the location of the accident to its proper department at either end of the line. It is only necessary to equip each train with a portable telephone and the means of connecting it to its lines along its right-of-way, to give such information to its officials as will enable them to issue instructions governing the entire situation. The information given over said line does not go through a public exchange and can be treated with such privacy as the official of the railroad company may see fit.

When equipped with telephones which have access to the general telephone system, the railroad company may establish communication between any of its offices over the commercial lines of the telephone company should service over their telegraph lines become impaired by accident, storm, etc.

With the active competition in the railroad field at the present day and the many inducements offered by the various railroads to secure the shipment of freight over their lines, the necessity of quick communication between the shipper and the freight department is keenly felt by the railroad companies.

It is conceded that a large portion of the business is transacted by personal solicitation, but there still remains a vast amount which must come through the channel afforded by the railroad telephone system. The busy shipper must have all such information as to the most direct route, rates for different classes of freight, arrival and departure of trains, time required en route, also information as to the so-called "hold overs" and re-shipment of cars. All this information can be given quickly with adequate telephone facilities.

Establishment of long distance lines between terminals has materially reduced the traveling of all officials and employees of the railroad company as these lines can be used during the day for important matters and at night for the checking up and correction of the many differences liable to occur on a large system. The long line also makes it possible to notify the offices at the destination of freight trains, the contents of cars, their final destination and many other details which overburden the telegraph circuits and create a great loss of time in awaiting replies.

To demonstrate the amount of telephone traffic of the New York, New Haven and Hartford Railroad during the year 1903 from its ten private branch exchanges, five being located it its piers and terminals at New York, one at New

Haven Connecticut, one at New London, Connecticut, one at Providence, Rhode Island, and two at Boston, Massachusetts, over six million connections were established. This record being obtained by peg count taken the tenth day of each month and used as a comparative statement of the daily business. Over the long line of this company between New York, New Haven, Providence and Boston, the records show that about seven thousand connections were established each month between the hours of 8 A. M. and 6 P. M.

In conclusion I will submit the following week day number of train movements made at the Boston Terminal Station:

Regular trains	838
Drafts to and from storage yards	387
Light engines to and from engine houses	367
Total movements to and from terminal	1592

The above figures showing the work that is actually being done by the use of the telephone.

DISCUSSION.

President Rhoads: Gentlemen, you have heard the paper read,—any discussion on the subject?

Mr. Kline: In Toledo, Ohio, we have a telephone exchange recently established that has 31 connections, and we find it a great thing. If a car goes out, and it has no bill, all the conductor has to do is to stop in the yard and ask the railway company's yard master where is the bill for the car. If he has not got it, the car is switched; if he has got it, it will go on the next train; it may have been inadvertently left behind. We all know that that creates a large saving of time. That is the only telephone exchange that I know of that is wholly operated by railroad companies, the different railway companies in that city paying their proportion of the expense. It was put up by the Central

Union Telephone Company and each company pays its part of the cost of operating.

Mr. Kaiser: In regard to the situation at Toledo. I was over there the other day and I saw the local manager of the telephone company and he explained to me the method of operating over there. There is an arrangement made, I believe, with the nine roads (they have a total of 31 telephones divided between the nine roads) and part of the switch board in the office of the Central Union Telephone Company is assigned to handle all the switches, and the cost of operation is paid by all the companies. There is a record kept there to see the amount of business done during the day. They average that between the nine roads, there are about 31 connections established just merely between the nine roads,—no other business is allowed to go over but the business between the terminals of the various city companies.

Mr. Kinsman: I would like to ask Mr. Kline, who, I believe, arranged the whole matter, why he gave us restricted service. What he has given us is good, but he might have gone a little farther and given us unrestricted service. We are on the way to good service, but we have not got it.

Mr. Jones: I handled that through Mr. Kline. It was the request of the officials that the service be restricted. We stand ready to give you either at the present price, but Mr. Peck of the Peoria and Mr. Marshall of the Lake Shore said that at present they wanted the service restricted. They might have exchange connections made, I think, they could be put in it, but now the service is restricted and it makes the service much better.

Mr. P. W. Miller: The success that we want calls for the facilities.

President Rhoads: Gentlemen, I agree with Mr. Kinsman. I would not approve that arrangement. We have unrestricted service.

A Voice: Put in exchange connections with the yardmaster's office?

Mr. Kinsman: We also have service three or four miles out. We are paying for two telephones because that telephone service is restricted.

Mr. Camp: As far as the Canadian Pacific is concerned, we don't move our trains to much extent by telephone. There are one or two points on the line where it has been used for many years. For instance, at Quebec, I think they have been using the telephone for moving the engines from the round house to the station before the C. P. R. R. was formed. We find the telephone very useful in our mountain sections, practically the whole mountain system is covered by telephone circuits, so that if any snowslide or washout occur, they are in communication with either side. In the City of Montreal we have a private branch exchange communicating with the public telephone service.

President Rhoads: You do not use the telephone for train orders over that mountain territory?

Mr. Camp: I cannot answer that definitely. I think that they do when they can't get a telegraph office, but there are occasions when they get stuck and they do use the telephones then to get orders to or from the nearest telegraph office. I was in hopes of hearing something more from some of the railroads in the states, to hear something of moving trains by telephone.

President Rhoads: You are too late to hear that. We had that subject up this morning. The next thing we would like to hear from is the Committee on Composite Circuits.

REPORT OF COMMITTEE ON RAILROAD COMPOSITE.

Read by E. P. Griffith, Chairman.

It is the understanding of your committee that the discussion on the subject of the composite system at our meeting, held in New Orleans, in May, 1903, left some doubt as

to the practicability of applying that system to railroad service, particularly on single or grounded wires, and that this committee was appointed to bring out the actual value of the system in the operation of railroads. We have, therefore, confined our report to circuits in various parts of the country which are known to us as being in actual operation.

The Chicago, Milwaukee & St. Paul Railroad has experimented between Chicago and Milwaukee, a distance of 80 miles, on copper and iron metallic composite systems, which at first were experiments not entirely satisfactory, due to the natural impedence in the straight conductor underground cables in the cities of Chicago and Milwaukee. This disturbance, however, was overcome by U. J. Fry, in the substition of a twisted pair of wires through the telephone company's underground cables from a point beyond the straight conductor underground cable terminal and the railroad offices at Chicago and Milwaukee, as shown in the blue print which accompanies this paper. This particular circuit is carried on a pole line with all kinds of simplex and multiplex telegraph systems, and where it may be said the disturbances are greater than in any other locality except New York City.

The Lehigh Valley Railroad has a specially constructed and fully transposed copper metallic composite circuit between Jersey City, N. J., and South Bethlehem, Pa., a distance of 90 miles, which has been known to this Association for some time as being in practical operation. The same railroad has two composite single line circuits; one of them 14 miles in length with four intermediate telegraph offices. It is equipped with the American Telephone and Telegraph Company's magneto ringing composite, known as No. 227, the wire being composed of No. 9 iron, 94 miles long with the telephone introduced in the center. There are four adjoining telegraph wires on the poles, but no multiplex systems, electric light or power line disturbances in the field.

The second grounded circuit on the Lehigh Valley road covers a distance of 43 miles with five intermediate offices

equipped with the American Telegraph and Telephone Company's ringing composite, known as No. 236, on a No. 9 iron wire, 105 miles long, with two telegraph wires on the same poles for the greater portion of the distance, and six to seven wires in a distance of ten miles. The composite was introduced at the northern end of the line where there are no disturbances. Both of these circuits are working satisfactorily and answer the purpose for which they are intended.

The Chicago, Burlington and Quincy Railway Company has, during the past year, made quite a considerable use of the railway composite apparatus, and the results have been reasonably satisfactory. The first circuit installed connected an important junction transfer point with a trainmaster's office, 23 miles distant, and soon after this circuit was extended to the end of the division, thus making the circuit 69 miles long. This allows the trainmaster to keep in touch with the car interchange at the junction point, and with the division terminal through which there is a heavy traffic. There are on the poles carrying this line, from 17 to 28 wires, nine of them quadruplex circuits. The wire in use is a single telegraph circuit.

Another Chicago, Burlington and Quincy Railway circuit that is working very satisfactorily, connects the division superintendent's office and master mechanic's office at the division headquarters with an important junction point 24 miles distant, and with the division terminal, 31 miles further on. This circuit has recently been extended by hooking up another instrument distant 49 miles still further on on a different wire; the two wires being connected together through a condenser. This makes the total length of the circuit 104 miles. The line is employed largely as a means of general communication, and from the blind sidings it is used by trains which may require help from the despatcher. There are 13 wires on the poles through most of this territory, five of them being quaded wires.

The Burlington road has three circuits radiating from a division headquarters, all three being hooked together by

means of condensers. Two circuits connect the division headquarters with blind sidings, one circuit being 40 miles in length, the other 37. The third circuit is 74 miles long and connects the division headquarters with the office of the assistant superintendent. All instruments are enabled to work with one another without trouble. On the poles carrying these circuits, are from 7 to 12 wires, the maximum number of quadded wires being four.

Some time since the Burlington road equipped a pile driver with two sets of instruments, and as it was necessary that signals be passed both ways, two sets of style No. 236 were used. The seven cells of Edison battery for each instrument were placed in a tray with handles to facilitate handling, the cells being sealed with paraffine wax. The results obtained were so satisfactory that the road named will make considerable use of the scheme in connection with work trains, wreckers, etc. It is hoped, however, that our friends, the telephone companies, will develop a set of instruments capable of receiving signals and still be a little more portable than the No. 236 type above mentioned.

Recently the Burlington road had a bad bank slide which required several weeks' use of the steam shovel to repair damage. In this instance the railway composite system was employed in place of the telegraph to control the movements of the work train.

All the circuits of the Burlington road are on iron wires. Experiments on this system on copper wires have indicated that better transmission for greater distances can be secured through their use, but all copper wires are quadruplexed, and as some little disturbance was felt on the quads through efforts to use them for telephone purposes, no regular use is now being made of those circuits.

The Erie Railroad has, perhaps, the longest single line composite system in operation up to the present time, and the various stages of experiments made on the 169-mile circuit between Cleveland and Galion, Ohio, may be espe-

cially interesting, for the reason that it was first started as a metallic circuit.

In August, 1903, the installation was completed between Cleveland and Galion, with intermediate telegraph and telephone offices at Leavittsburg, Kent and Akron, Ohio, or five stations in all. One of the wires used was a No. 11, or 210-pound copper wire, worked single between New York and Chicago, one thousand miles, with a side line composed of a No. 8 iron wire through a repeater at Leavittsburg, thence fifty miles to Cleveland. This No. 8 iron wire between Leavittsburg and Cleveland was used as one side of the circuit in the original experiments. The second wire was composed of 174-pound copper wire extending as a telegraph circuit from Cleveland to Chicago via Leavittsburg, 459 miles. Both wires passed through two miles of underground cable in Cleveland. The American Telephone and Telegraph Company's No. 227 hand generator ringing sets were used, polarization cells were bridged around intermediate relays, and flat condensers around intermediate offices.

It was impossible to get good commercial talk from Cleveland to Galion, 169 miles, or from Cleveland to Akron, 87 miles, although it was good from Cleveland to Kent, 61 miles, and to Leavittsburg, 50 miles, notwithstanding the unbalanced condition of the wires. A test made from Newburg, Ohio, four miles beyond the underground terminal in Cleveland, gave very fair transmission to Galion, 163 miles, but the disturbances on the telegraph side from ringing and the inequality of the two wires caused the Erie to change on October 15, 1903, to a grounded circuit; building up such circuit to consist of 174 pound copper wire the entire distance except through cables.

The hand generator ringing sets, No. 227, were exchanged for the battery ringing type, No. 236, with 7 cells of type BB Edison battery. This arrangement eliminated the disturbances on the telegraph and gave the Erie a satisfactory talk from Cleveland to Galion, 169 miles; but they could

not find an adjustment of the ringing apparatus which would enable them to ring Galion from Cleveland, although intermediate stations could ring each other.

The frequent punctures of condensers by lightning at the several stations was very considerably reduced by the substitution of Argus lightning arresters, and the Erie Railroad now has a fairly reliable telephonic communication for 169 miles, using the telegraph to call the distant terminal to the telephone and relieving the telegraph side of conversation which ordinarily would tie up the telegraph wire from half an hour to an hour at a time.

The conditions surrounding the Erie circuit are as follows: Two miles of underground cables; 48 miles of poles carrying 37 telegraph wires used in simplex, multiplex and automatic telegraph systems; 119 miles of pole line carrying seven telegraph wires with no electric light or power transmission wires paralleling. A composite wire belonging to the Cleveland, Akron and Columbus Railway parallels the Erie wire for about one-half mile and "cross talk" was audible on May 3, 1904, but not of sufficient volume to destroy the privacy of the circuit.

It is the sense of your committee's investigations that the composite system is of considerable value as an auxiliary to the telegraph in railroad service, under favorable conditions, by providing a means of conversation between the general offices and division superintendents, and between the latter and yardmasters in obtaining yard situations and in relieving congested telegraph wires of conversations by wire; that, in its present stage, it is limited to one circuit on any one pole line and cannot be considered as a satisfactory intercommunicative system worked in connection with a public or private branch exchange.

Signed—E. P. Griffith, chairman; W. W. Ryder, U. J. Fry and J. H. Jacoby, Committee.

DISCUSSION.

President Rhoads: Gentlemen, you have heard the report of the committee, which, I think, is fully in line with the instructions received at the New Orleans Convention. Have you any remarks to make or questions to be put to the chairman or any of the members of the committee?

Mr. Ryder: I notice that the report says that the Burlington established a composite circuit for a distance of forty miles in connection with two work trains and that it worked satisfactorily. The conditions were quite favorable. It was a line where there were but four telegraph wires and the test I made there personally, failed to show any considerable noise, it was generally more quiet than any line that I have listened to for a long time.

President Rhoads: Will you be kind enough to tell us what you accomplished by using the communication between the two work trains?

Mr. Ryder: Well, the work trains have quite a territory and there was considerable distance between the telegraph offices, and the question was as to opening two telegraph offices or establish this telephone instead and we have these so-called portable sets. By means of having communication with a telegraph office, that office posted them as to the trains and in that manner they obtained a great deal of time on first-class trains. I don't know as they handle regular train orders, but they get the time of trains in some manner or other which enables them to get the maximum amount of work out of the men. It is simply a proposition to employ two telegraph operators at one hundred dollars a month or to put in these telephones.

Mr. Selden: It seems we are moving trains by telephone and yet we are not. That arrangement between themselves argues that because it is a short distance there is not much chance of trouble and if they are work trains and there is trouble they only kill a few Italians. I think that the discussion has brought out that they are using the telephone for the movement of trains, but they don't consider that they are doing it, because they do not send them the regular train orders.

On the composite, we have had some little experience. We have an iron circuit extending from South Chicago, with intermediate offices for telephones, to Wolf Lake yard, and thence to Garret, Indiana,—an iron wire one hundred and twenty-eight miles long. It was installed this last November. We have never had a kick on it, it has worked right straight along and we have not had to make a single adjustment so far as I have been informed. We extended another circuit from Garret, Indiana, to Chicago Junction, Ohio, on an iron wire, 128 miles, and we were equally successful there. We then extended another circuit from Chicago Junction to Newark, Ohio, which has worked perfectly. We then put in a circuit to Wheeling, West Virginia, 106 miles, using, also, iron wire. We rang parties and we talked all right. Some time after that I went into my general office in Baltimore and found that they were not working the quad. I asked them why they were not working the quad and they said, "We can't get induction off these iron wires." We had no trouble on that circuit before, but just why it was that for weeks we talked on an iron wire without any trouble whatsoever and why we cannot do it now, has never been demonstrated to my satisfaction. We made a circuit from Wheeling to Zanesville with eleven, afterwards thirteen, stations. The induction from the telegraph lines,—there are quite a number of them part of the way out, was very slightly felt. As I understand they strung a metallic circuit there to make one side of the circuit and put these composite sets upon that wire. That was used for the movement of trains by telephone, we having there nine work trains. They do not send orders to regular passenger trains, but they work the work trains all right and we use these instruments to get connection from the point where the work train may be to the despatcher's office. We put in a switch to cut off these instruments so that they are not all inserted at one time. That has worked first rate. We then proceeded from Wheeling to Grafton, West Virginia, 104 miles. That circuit is working on an iron wire. We are working one iron wire from Grafton to Parkersburg,

another 140 miles. We have a circuit also from Bellington to Cumberland. We have a circuit from Grafton to Bellington. We have from Baltimore to Brunswick a seventy-mile circuit. So that our entire railroad system is covered by composite service. On the first division, over ninety-five miles, we have not had any trouble at all, but we had to adjust the ringing apparatus sometimes two or three times a week. Our principal troubles have been in the adjustment for the ringing apparatus, either we get the slow relay too fast or the fast relay too slow. If some method would be evolved whereby we could be relieved of that sort of trouble, I should be able to say at once that the composite set would be most desirable.

Mr. Van Etten: We are having it about as bad on the quadded wire from Chicago to Danville, 125 miles. It has been in the service every day since last July and I don't know of but one or two occasions where we had trouble on the quad and we suppose that trouble is from the phones, but we would take the phones off and the trouble still stayed in. So we put the phones back and we use them right along and for the past two or three months we have had excellent service. They can ring very easily between Danville and Chicago without any trouble. We have extended that circuit from Danville to St. Elmo, 175 miles more, through condenser on these other wires from Danville to St. Elmo, and we have no trouble whatever in talking between Chicago and St. Elmo, 247 miles. We cannot ring through that condenser, but by simply telling St. Elmo to answer, Chicago can get it. But it is just as Mr. Selden says, the most trouble we have had has been with the ringing apparatus, getting it properly adjusted, but the last sets they have set out—266—we have had about six weeks and we have had no trouble with them at all on our quadded wires. We have another circuit on an iron wire 75 miles, with four sets on it, and we have had no trouble with that whatever. We have another from Danville to Clinton, 40 miles, with four sets, and on that we have good service. One

other runs from Momence to Brazil. We have two instruments that we have not looked at at all in six months. On the despatcher's wire between St. Elmo and Thebes, 167 miles, we have four telegraphones. These have been in since last January and we have had good service on that with no interruptions. And we have also in the last six weeks been handling gravel trains on one of our extensions over there. We have five telegraphones on that line and we are handling gravel trains with no Morse instruments on the line. We find that the best service we get is on the copper wire and we expect to have a talking circuit through to St. Louis, 115 miles,—90 miles longer than the St. Elmo circuit.

Mr. Hope: I would like to ask Mr. Van Etten in regard to the cost of maintaining the ringing apparatus, whether he found it very expensive or not?

Mr. Van Etten: I find that we have to change those batteries on the average about every four months. I keep regular tab on every instrument—I have 26 now—and whenever there is trouble reported the first thing to look at is the batteries, and I find that they have to be changed between every three or four months and the expense of cleaning a battery is a little over three dollars if you buy the battery material the way it is put up by the Edison people, but we have been buying it in bulk, and it has cut that down to about two dollars. The new 66 sets have three line batteries and they claim that the batteries will last about eight or nine months. At first, every time we would have trouble on the quadded circuit, we thought it was in the instruments, but every time we would cut them off we would have the same trouble. We think now that it is in our telegraphones.

Mr. Selden: I would like to ask, Mr. President, the distance of your quad, how much of the wire is quadded?

Mr. Van Etten: 125 miles.

Mr. Selden: The wire is iron?

Mr. Van Etten: Copper.

Mr. Selden: Do you remember the gauge?

Mr. Van Etten: 210 pounds to the mile.

Mr. Selden: What voltage of battery do you use?

Mr. Van Etten: Well, on the quad about 400, 200 at each end. We don't have any trouble in balancing the quad, but when we have a 573 miles circuit, that is to say, a copper wire, and work the quad with 375 volts at each end, we find that the effect of the Morse signals is so great that we can't work the composite with any degree of success at all.

Mr. Selden: Do you have terminal boxes on the quadded wire?

Mr. Van Etten: I do not recollect. I think that might have been the trouble. We took them off and we had better success without them.

Mr. Jacoby: I would like to ask Mr. Van Etten what he refers to by the word "telegraphone?" What really is implied by that term? You hear it often called "telegraphone," but I believe there is another apparatus to which that name really applies.

Mr. Van Etten: It is the regular composite set.

Mr. Jacoby: That is not, strictly speaking, a telegraphone.

Mr. Van Etten: That is the name they give it.

Mr. Weidman: I have just received to-day a letter which refers to an instrument of this kind made by the J. Adams-Randall Telephone Company. I believe they have an exhibit here. I would like very much to have a demonstration of their apparatus. Mr. Randall is probably about somewhere. Perhaps he would like to speak for himself.

President Rhoads: Mr. Randall, have you any word to say?

Mr. Randall: I should have great pleasure in showing the instruments I have installed here. I cannot show the system exactly as I have it on line, but I can demonstrate the increase of power through my transmitter from four cells to forty-eight cells and increasing the initial output of my transmitter to overcome the troubles of resistance and leak-

age and to overcome the troubles from induction by desensitizing my receiver and adding to my transmitter current enough to work the receiver after the induction has been cut out. I have made a great many tests and located very difficult lines. I had a section of a circuit from Weehauken to Kingston, New York,—80 miles—which was very old iron telegraph wire, and very high resistance, three miles of cable (a mile and a half underground and a mile and a half aerial). The current (there are 70 telegraph wires on the pole line) used in telegraphing was 400 volts or 475 volts at each end and I grounded my circuit from condensers at Weehauken and Kingston. The induction from telegraph currents or telegraph wires was so great that you could not hold the Kingston receiver to your ear. I desensitized my receiver until that disappeared and then worked my circuit talking from Kingston to Weehauken through my receiver without holding it to my ear. Mr. A. B. Taylor, of the New York Central, and Mr. S. S. Bridge were there and they will testify to all of this. I have worked a circuit 300 miles, iron telegraph wire, grounded, with 60 miles submerged telegraph cable in between very difficult circuits, between London, England, and Brussels, Belgium. I have not worked a longer circuit in this country than from 23d street, New York, to Montauk Point, on the Long Island Railroad.

I should be very glad to show it to the gentlemen present.

Mr. Fowle: I should like to say on behalf of Mr. Brookes that he has set up for the benefit of any one, a complete circuit line with several intermediate telegraph offices. The set works on an artificial line, and he extends a cordial invitation to call on him at his office in the Majestic Building and see that apparatus.

Mr. Selden: I would like to ask whether Mr. Randall puts his instruments out by sale or lease.

Mr. Randall: We are just ready to manufacture in large quantities and we shall put them out probably both by sale and by lease.

Mr. Selden: The longest test was the test from 23d street through the underground cable and out to Montauk Point?

Mr. Randall: Yes, 117 miles.

Mr. Weidman: I would like to ask Mr. Randall another question, whether he has had any experience with his telephone or telegraph line as a quadruplex line.

Mr. Randall: I never had enough trouble to make that test. I have heard that others have accomplished that.

Mr. Weidman: I might say that we have two pairs of metallic and telephone wire between Detroit and Mackinaw. Of course the service is not what it might be. A conversation can be carried on fairly well. Mr. Randall, probably your method of signaling is incomplete; likely it is.

Mr. Randall: I think it entirely new. I have never seen anything like it. I use a rapid automatic vibrating device which gives a high rate of vibration in the present circuit induction coil. On this circuit that I mentioned from Kingston to Weehauken I use 15 cells, or series of cells. I use a horn and conversation can be heard forty feet away from the phone.

Mr. Millington: In the matter of composite repeaters, I think I can add some testimony of value, as we have been in the composite business for quite a long time. On our composite circuits we use the same instruments as on the others. We made some extensions in the winter, last February, with the assistance of the A. T. & T. Company, and we have the largest amount of equipment of any railroad in the country, and I would like to say here that our service has been a very great success and our officers, superintendent, trainmaster, despatcher, yardmaster, and others say they simply could not "keep house" without it. The longest circuit reaches from Michigan City to Jackson Junction, through Niles, Kalamazoo, Battle Creek, including the division superintendent's office at Jackson and the master mechanic's office at Jackson Junction. It is proving very valuable indeed to our mechanical department; the master mechanic at Mich-

igan City having direct communication with the head master mechanic at Jackson. He informs me that he is enabled to carry five thousand dollars less of stock because he is in immediate touch with the master mechanic at Jackson and can give a minute description of the material wanted, which he could not do by telegraph. We have the division superintendent on the circuit with the stockyards, and with Kensington, and in that we have about nine and one-half miles of cable, underground and aerial.

The first circuit that we installed was between Kensington and Calumet Park, Hammond and Niles, and that was a superior circuit, the service being better than the average city exchange circuit. We have a circuit between Detroit, Windsor and St. Thomas that is so superior that our general manager, after an experience during the winter, told us that when he asked the chief despatcher at St. Thomas some questions he could hear him tapping with a lead pencil on the ledge in the telephone booth while he was talking.

President Rhoads: That is copper wire?

Mr. Millington: Yes, sir, all the others are iron. The other day the bridge engineer at Detroit wished to talk for a few minutes with his bridge foreman at Welland, and we cut out the terminal coils at St. Thomas and they carried on a very successful conversation a distance of 275 miles. The chief despatcher at St. Thomas told me the other day that the composite is in use nearly all the time.

Secretary Drew: I want it put on record to go in our minutes, before another word is said, that fifty-five men have sat in this room from half past seven o'clock until ten o'clock attending to business, for the first time in the history of the Association we have been able to hold so large a number that length of time. It simply speaks of the interest that the members and its friends are showing in the work of the Association.

But as to the composite business. I have a little circuit that runs out of Chicago, through all of its cables in the city, out to a little yard called Kolze. It is only 20 miles long, but the resistance is 150 miles long, and we use that

circuit to a great advantage. It is on a copper wire and is bridged over by a condenser onto another wire, which runs on about seven miles to a yard at Hawthorn. Chicago, Hawthorn and Kolze are the only three instruments on the circuit; it saves us a great deal of delay and a great deal of trouble. We are enabled to keep in touch with engines in these three yards and to move our trains much more rapidly. I wish to say that I appealed to my friend Francis to give us a regular telephone circuit, but we found that it would cost us about $1200 a year and we were compelled to find some other method of communication between these three points. I would like to ask the gentleman from the Lake Shore how he has succeeded in eliminating the cross talk.

Mr. Kline: We have no trouble with the Lake Shore. We have a line between Englewood and Elkhart, about 90 miles long, and it is very successful.

Mr. Van Etten: We have found that our short lines work very well. There is more or less talk on the long lines when the long lines run parallel we get cross talk. We have eliminated it on the short lines by making these short lines metallic circuits, thus taking it off. I would say further that the open circuit wire which is single through to St. Elmo gives us no trouble in talking and ringing.

Mr. Fowle: Between parallel grounded circuits on the same pole line there will be serious cross-talk, and so far as overhearing in one circuit what is said in another the telephones might just as well be connected to one wire instead of two,—or more. Between one grounded and one metallic circuit the cross-talk may be eliminated by transposition of the metallic circuit; if the circuits are directly adjacent on the pole line, it may be necessary to transpose every quarter mile. If a long composited line, of the grounded type, is paralleled by a short metallic line of one or two miles length, it is usually the case that the cross-talk is in one direction only,—conversation on the grounded line being overheard on the metallic line, but not vice versa. This is due to the use of shunted receivers on the composited line and to heavy battery power. The cross-talk may sometimes be eliminated

by shunting the receivers on the metallic line. If a long composited line, of the grounded type, is paralleled by a short uncomposited line, of the grounded type, the cross-talk may sometimes be eliminated by shunting the receivers on the uncomposited line; it is important not to use heavy battery on the uncomposited line. The shunting of a receiver by a low, inductive resistance reduces its telephone efficiency and its general sensitiveness. Its sensitiveness to low frequency currents and to telegraphic impulses is decreased in a greater ratio than its sensitiveness to telephonic currents however, and hence a shunted receiver is an advantage on noisy ground lines.

Mr. Ryder: I have been in hopes that this discussion to-night would bring out something along the line of connecting the composite circuit with the private branch exchange. This is a good field and I would like to know if any of the members have made that move.

Mr. Parsons: The Illinois Central has made a move of that sort. We are using a composite set forty miles, repeating it into a long distance metallic line from Champaign to Chicago, 128 miles. We take them through the switchboards.

Mr. Ryder: From each station?

Mr. Parsons: From each station.

President Rhoads: That is connected with the metallic circuit at the outskirts of the city?

Secretary Drew: Mr. Chairman, I think we are going to get through. I think we have done good solid work here this evening and I take it that with three hours to-morrow morning we can close up all the rest of the papers we have, elect our officers, select the place of next meeting and go on our way, and I therefore move that we adjourn until to-morrow morning at 9:30 sharp.

Motion seconded and carried.

FOURTH SESSION.

Thursday Morning, June 16th, 1904.

Pursuant to adjournment, the Convention met Thurs-

day morning, June 16th, at 9:30, President Rhoads in the chair.

President Rhoads: Gentlemen, let us all come to order and get started as our time is limited this morning. Mr. Secretary has something special.

Secretary Drew: The first thing, Mr. President, is to vote on another member, Mr. William Kline, of the Lake Shore and Michigan Southern. I move that he be made an active member.

Motion seconded and carried.

Secretary Drew: I have a little article here which I would like to read. It is from the Train Despatchers' Association of America, by John F. Mackie.

Chicago, May 31, 1904.

Mr. P. W. Drew, Secretary,
Telegraph Superintendents' Association,
Milwaukee, Wis.

Dear Mr. Drew:—It has been suggested to me that possibly your Association might desire to have an official organ and might look favorably upon our official organ, the Train Despatchers' Bulletin, as worthy of serving them in that capacity. While I am not prepared to make any proposition in the matter, I should be glad to hear from you as to what you think of the matter, and whether it would be worth while to bring it before the coming convention of your Association for consideration. The extremely low price of the Bulletin might give you the benefit of an organ in which some pages, whose number could be arranged for, might be devoted to your affairs or to affairs interesting to your Association, the matter to be furnished by some one designated by you. I think I may say without vanity that the Train Despatchers' Bulletin has made for itself a standing as the organ of our Association, with which you need not be ashamed to connect yourselves.

I should be glad to hear from you on the subject.

Yours very truly,
John F. Mackie,
Secretary.

Secretary Drew: As to this communication I wish to say that with our friend Taltavall, who never hesitates to publish anything that we want to have published and always gives us very good notices in the "Telegraph Age," I do not think it is worth our while to try to get a page in this other paper. I simply mention this matter that we may dispose of it promptly.

Mr. Selden: I move his offer be declined with thanks. We have no official organ and I do not think we want to constitute one.

President Rhoads: You have heard the motion, all in favor signify it by saying "aye."

Motion carried.

Secretary Drew: We have another communication here from somebody who wants to sell a pocket relay, from Mrs. R. H. Fletcher, of Brooklyn, N. Y.; she wants $5.00. I just bring it before you. If any one wants a pocket relay for $5.00, he can get it.

President Rhoads: I would just say, gentlemen, that Mrs. Fletcher is the widow of the former superintendent of telegraph of the Lake Shore road and from some reason seems to be in destitute circumstances, and she wants to sell this pocket relay.

Secretary Drew: We have, Mr. President, one death to report. Our President stated in his address yesterday that we had had no death in our Association. We have had one. Mr. F. D. Cudlipp, Superintendent of Telegraph of the A. C. Line, Wilmington, N. C., died during the year. He had only been a member a few months and had not attended any of the meetings. I do not know that it is necessary to take any further action.

We have another matter brought to our notice by the family of Robert Stewart, who was a member of this Association for a very long time. They have sent quite a little account of his illness and evidently expect us to take some action, so that, if it is agreeable we will devote a memorial page in the minutes to Mr. Robert Stewart.

Motion made and carried.

Secretary Drew: We have a communication here from Mr. O'Leary in regard to the Telegraphers' Mutual Benefit Association. It has been brought before our Association by Mr. Rhoads, to whom he sent out one of his circulars. I do not know that there is anything more that we can do. We all appreciate the Telegraphers' Mutual Benefit Association and what it is doing. I simply bring this before you as another item that we might pass on if we wish.

Mr. Selden: I think it is a pretty good idea that the Association provides these benefits. When a death occurs among the operators who are members of this Association, it pays and pays promptly. It is good and fair insurance. A great many operators are ignorant of it and I think also that a great many officials do not know anything about it. What do you pay, Mr. O'Leary?

Mr. O'Leary: $1,000 to $1,500 on each death. The rates are graded according to age, from 18 to 30, 30 to 35, 35 to 40, 40 to 48. I might state that there has been a great deal said since coming to this Convention in regard to the telegraph operator and of the treatment of methods of making him more proficient in his work. But there is also the unfortunate side. One of the most potent factors is the good-will of the employees in anything. They must be contented with their work. That is a very potent factor in the matter. Now, if a man is restless and out of sorts and worried you cannot get as much work out of him as you could if he were in a bright frame of mind and contented. The T. M. B. A. was started many years ago for the purpose of providing for the families of the operators. Is is favored by the telegraph companies and was endorced by this Association ten years ago. It has the good-will of the superintendents of telegraph. The only thing that we can do is to bring it to the attention of the Association every once in a while. Their appreciation of the T. M. B. A. encourages the members in its work. Many operators, as you well know, receive but small salaries and are unable to make a large provision for their families, but by taking membership in the Telegra-

phers' Association they can at once acquire a competency for their families. When a man knows that his family is provided for, he can do his work better because his mind is at rest in that matter. I thank you, Mr. President, for the opportunity of bringing it again to the attention of the members.

Secretary Drew: I just wish to say that I hold several policies of insurance, but the cheapest insurance that I have is in the Telegraphers' Mutual Benefit Association. It costs me $13.00 a year per thousand and that is much cheaper than my old line policies, and it is sure,—there is no question about the standing of the Association.

Mr. Camp: I might say that the Canadian Pacific issues a telephone notice to all offices every alternate month and the last page of this circular contains an "ad" of the T. M. B. A. If Mr. O'Leary wishes any change made in the reading of this "ad," if he will advise me, I will have it altered.

Secretary Drew: We are practically limited in the use of this room to-day, as another Association has been promised it at 1 o'clock if we are through. The hotel people say that they do not want us to feel that we are driven out. We may have to adjourn, perhaps, when we are in a very interesting stage of this meeting. It strikes me that the essential things should be done first and then start on the papers. Therefore, I move you that we now proceed to the selection of a place for the next annual meeting and to elect the officers.

President Rhoads: You have heard the suggestion. I guess we can act on that without a motion. What is your pleasure in regard to the manner of proceeding to select the place of the next meeting? Has somebody something to say as to where we shall meet next year?

Secretary Drew: I have several invitations here. We have one from Atlanta, one from Detroit, one from Milwaukee, and one from Put-in-Bay Island. This last we get regularly every year. These four have issued invitations.

Mr. Lang: Mr. President, I would like to invite the Association to meet at Chattanooga next year, sometime in May. Chattanooga, as everybody knows, is the center of very many historical associations. The hotel facilities are ample, both in the city of Chattanooga and on Lookout Mountain, and the railroad facilities are ample in every direction. I am sure that every railroad entering Chattanooga will be pleased to extend every possible courtesy to the Association.

President Rhoads: Has any one else a word to say?

Mr. Foley: I would like to suggest Atlantic City.

Mr. Selden: I have noticed that when we take the meeting of the Association to any great distance, either north, or south, or east, or west, the chances of a full attendance are very small. The chances for a large meeting are better in a comparatively central city. Niagara Falls, Detroit, Chicago, Cleveland, Indianapolis, for instance (although, I think that possibly we are indebted somewhat for this attendance on account of the fair), are much better than in taking the Convention to San Francisco, New Orleans or Philadelphia, or even Washington, so that, if you get a large crowd in attendance, it is better to select a half-way point instead of bringing the members way across the country. I have no particular point in view, but from the history of the meetings that we have held and the crowds that we have had, Detroit, Niagara Falls and points of that character are the best places. I would favor a central point. We tried to meet at Atlanta once, and unfortunately our member there died just prior to the meeting and we changed it to some other point, and we had a very small meeting. We did not have a very large meeting at Washington. We had a goodly attendance, but that is due to the fact that it is the nation's capitol. We had better get to a half-way point for all of us. Chattanooga is a nice place to go. I have been there and it is well worth the trip and visit, and they do everything in the world they can for you down there. As to whether we want to go to Atlantic City. Of

course we know we will have a good time there; it is a nice place to go, but I doubt if you get many of the Western members that far east.

Secretary Drew: There is one little objection that I see to Chattanooga and that is the fact that the old-timers meet at Atlanta and quite a number of the members of this Association will go to the old-timers' meeting at Atlanta. It strikes me that it is as Mr. Selden has said, we had better go to some central point. We did have an invitation early in the year from Buffalo. I did not bring it because it was so long ago—ten or eleven months ago. I presume, however, we could be well taken care of in Buffalo. There is one point about Buffalo, it is the central line of the pass question. Every one can get to Buffalo regardless of anything but the regular request. When we go past the line of Buffalo or Pittsburg, we have to do more or less manipulation. We have been assured that if we want to go to Chattanooga we can be provided for all right. If we strike Buffalo or Detroit, we would have more or less trouble about passes in going east of those points.

Mr. Kinsman: I would like to suggest Detroit as the place of the next meeting.

Mr. Hope: I have quite a number of friends at Buffalo and every little while they get very anxious for our Association to meet there. Buffalo is a splendid place and they take good care of us there.

President Rhoads: I had the pleasure of attending the International Convention at Buffalo and we were royally entertained. It is still open for remarks.

Mr. Selden: I move that we meet at Detroit next year.

Seconded.

Mr. Hope: I offer an amendment to Mr. Selden's motion to make it Buffalo instead of Detroit.

Seconded.

President Rhoads: Any remarks in regard to these places?

Mr. Selden: We accept the amendment.

Mr. Lang: Personally, I would a good real rather go to Buffalo than have the Association come to Chattanooga, but we have been to Buffalo. We have been to nearly every important central city of the United States. Certainly we can find entertainment that we will appreciate and remember for years to come if we come to the historic City of Chattanooga. I am not at all strenuous in the matter because I know if the Association comes there, you will all have a good time. I move, Mr. President, an amendment to the amendment, that we select Chattanooga.

Seconded.

Voices: Question, question!

President Rhoads: The amendment to be voted on is that we go to Detroit next year, are you ready for the question? Those in favor of Detroit will signify it by standing. (Vote.) Those opposed to Detroit will please stand. (Vote.) It seems as though Detroit had lost out, gentlemen. The motion now is shall we go to Chattanooga? Those in favor of Chattanooga please rise. (Vote.) Those opposed to Chattanooga please stand. (Vote.) Gentlemen, it is observed that our next meeting place will be Chattanooga.

Mr. Lang: As we are to go to Chattanooga for our next meeting, I move that we meet in the month of May, the third Wednesday in May, instead of June.

Seconded.

President Rhoads: Those in favor of the third Wednesday in May at Chattanooga for the next annual meeting signify it by saying "aye." (Vote.) It seems to be unanimous. We will proceed to the election of the President for the ensuing year. We are ready for nominations for President, or how shall we proceed? I believe there is no fixed rule. Sometimes we have had a nominating committee that has made the nominations for the different offices, and at other times we have had an open meeting.

Mr. Selden: Mr. President, I think we had better have a ballot. It seems to me that it will not take long for the members present to simply write the name on a slip.

Mr. Williams: Vote without the nomination?

Secretary Drew: In order to save time, I think it would be just as well to put in nomination one or more persons and if we are agreed it would not take us very long to make the election. I have always been very careful never to make any reference to any preference that I had for President, considering that, as Secretary of the Association, it was not fitting that I should. But we have one man with us that is so evidently a proper candidate for that place that I am tempted to violate my self-imposed rule. We have a member with us who has been a member a very long time, and I think we ought to recognize that fact, and I would like to place in nomination the name of Mr. H. C. Hope, of St. Paul.

Seconded.

President Rhoads: Gentlemen, you have heard the nomination just seconded. Are there any other nominations?

Mr. Williams: I move the nominations close.

Seconded and carried.

President Rhoads: We vote now upon the election of Mr. Hope as President for the ensuing year. How shall we take the vote?

A Voice: I move, Mr. President, that the Secretary cast the ballot for Mr. Hope.

Seconded and carried.

Mr. Hope: As Vice-President, I would be very glad to have one associated with me in the work in caring for the Convention some one who is in that territory, and I would nominate Mr. E. E. Torrey, of the Mobile and Ohio Railroad.

A Voice: I move that the Secretary cast the ballot for Mr. Torrey as Vice-President.

Seconded and carried.

President Rhoads: The Secretary has cast the ballot for Mr. Torrey as Vice-President. The next is the Secretary and Treasurer. Has some one a selection of a better man than the gentleman that has been serving us in the past?

A Voice: I move that the President cast the ballot for Mr. Drew.

Seconded and carried.

Secretary Drew: I thank you, gentlemen.

President Rhoads: The President takes pleasure in casting the ballot for Milwaukee, the town made famous by Mr. Drew.

President Rhoads: I believe it is in order for the new President to take the chair. I will appoint Mr. Weidman and Mr. Kline to escort the new President to the chair.

President-elect Hope was then escorted to the chair by Mr. Weidman and Mr. Cline.

President Rhoads: I have the pleasure of introducing Mr. Hope, of St. Paul.

President Hope: I appreciate the honor that you have shown me and I assure you that I will do my best to fill the position and to look after the Association's interests, and will be pleased to assist the Secretary and all the members in doing what we can to advance the interests of the Association. I thank you again.

I believe the next in order is an address by the new Vice-President.

Mr. Torrey: Gentlemen, I also wish to thank you for this honor, which you have bestowed upon me. I have recently located in the South, and I assure you I shall take pleasure in doing all I can to assist in making the arrangements necessary for the meeting next year. I hope to see a good attendance down there with Brother Lang. I think we will make you all feel happy.

Secretary Drew: If it is not out of order, I would like to say one word about increasing our membership. We have a good many railroads, short lines, up here, and it is surprising that those men do not come into our Association. It seems to me that if the individual members would speak to those who are not members we could easily increase our membership by twenty or thirty. It seems to me that it is

worth while to make the effort in that direction and get members from some of the smaller roads that have not been recognized in this Association.

We have lost a great many members by consolidation, and now the membership in many instances is cut down to one or two; of course, that makes quite a difference in our membership. One gentleman was surprised to learn that at one time we had a membership of 125 and now we have only 75. One would naturally think that the Association was going backwards, which is not the fact, but rather to the contrary. Everybody wants to get a copy of our proceedings. We ought to get in all of these members that we can and increase our membership to make it more interesting.

Mr. Selden: It would be a good idea, I think, for the Secretary to make a rule to charge five dollars for a copy of the minutes and give the purchaser a membership with the minutes for his five dollars.

Mr. Rhoads: I would like to say a word before we listen to the papers, in regard to the composite sets that are up here. The most modern equipment that the A. T. & T. Co. has is put by them on exhibition at the Central Union office in the Majestic Building.

Mr. Lang: Mr. President, in that line, you will all remember that last year we had exhibited a device patented by Mr. Jones for the purpose of raising the operator if his key is left open or his wire grounded, etc. Mr. Jones has his apparatus on exhibition here. During the year it has been operated on the Illinois Central Railroad. I would be glad to hear from Mr. Parsons what their experience has been with it.

Mr. Parsons: We are using Mr. Jones' device on the Chicago Division, having 28 offices and sets installed last December. We have not had a case where the clock has failed to do the work excepting once, and that time the operator left the cut-out set cut in. I understand that Mr. Jones has it fixed now so that is always in.

President Hope: I would like to ask, for the information of all the members present, what is the number of that room?

A Voice: 134.

President Hope: Right next to the parlor door. Gentlemen, we will now proceed with the papers, one on the typewriting telegraph by L. S. Wells, of the Long Island Railroad, to be read, I believe, by Mr. Ryder.

Mr. Ryder: Before I read that paper I would like to say that the Committee on Topics have one more paper reported that was not mentioned yesterday. Mr. Maver has kindly prepared a paper on "Recent Improvements in Wireless Telegraphy" that we want to appear in our minutes.

THE TYPEWRITER IN RAILROAD SERVICE, AND THE TYPEWRITING TELEGRAPH.

By L. S. Wells,

Of the Long Island Railroad.

(Read by Mr. Ryder.)

The advantage of having telegrams typewritten is so pronounced, and the use of typewriters in the telegraph field is becoming so general, that it may not be out of order at this time, to venture a few friendly criticisms upon our apparent tardiness in bringing into more direct application this valuable adjunct.

The wheels of evolution in branches of electrical science, except perhaps the art of transmitting and receiving Morse characters, have moved with wonderful rapidity, and developments in the last decade have been marvelous, and almost beyond conception. With a mighty force has this electrical wave swept onward, sometimes through the channels of scientific research, sometimes through accidental discovery, until to-day we find it supplying the whole world with energy and light, annihilating space and revealing to us that which had hitherto been hidden by an impenetrable curtain of darkness.

The telegraph, however wonderful and clever in its inception is to-day somewhat more comprehensive, and its utility somewhat broadened in that a single wire can be made to convey many messages at the same time. Better still, we find a single wire carrying the Morse characters and human speech simultaneously. However great and wonderful has been this advance scientifically, we are disappointed when we see the ancient Morse signals still the prevailing method of transmitting telegraphic intelligence. The operator of to-day bends in the same attitude over his key as did the early student of Morse more than sixty years ago. If the wizard of Jersey should recur to the art of his early choice he would experience very little difference in the method of making and deciphering dots and dashes, from that of his younger days. Compared with other branches of electrical science there has been little progress shown, and it is a question whether the operator of to-day is more skilled than the pioneer of nearly half a century ago. To venture more critically into the history of the telegraph, I might say that there has been less progress shown, in certain directions, than in any of the other channels of electrical science. It is obvious that there must be some reason for this, and I trust it is not that we have become apathetic or that our inventive genius is lacking.

It is not my intention to decry the efforts made to bring forth a keyboard system of transmitting Morse characters, neither is it my wish to convey the idea that engineering skill and genius have not been applied in the direction of evolving a system which will automatically transmit and receive signals and convert them into typewritten language. Efforts have been made along these lines with a considerable degree of success.

The natural trend of development has long since relegated to the rear the autographic system of letter writing in our commercial life, and we find as a substitute the typewriter. We wonder at the long period of time which elapsed before the typewriter keyboard system of transmission was

developed sufficiently to be placed into commercial use. Many inventors have long since been on the verge of success in meeting the issue. Not until a few months ago has a commercial machine been placed on the market. I refer to the Yetman system which has found its way into a few of our offices. We must give Mr. Yetman credit for evolving a system of automatic transmission into a practical everyday working machine; yet we find it only an evolution of the primary ideas of Professor Morse, the object being a more speedy and less tedious method of transmitting the Morse alphabet, than by the use of the manual key. Although the keyboard transmitting system was slow in reaching us, we are satisfied—pleased—and yet expecting that some inventor will bring forth a still more simple method, which may be economical for the purchaser, who in many cases is the operator with a salary limiting him to the most economical expenditures.

The keyboard transmitting system, at best, is only a step in the right direction, the Utopian ideas of the telegraph engineer being the great and coming evolution in the telegraph field, to transmit and receive telegraphic intelligence without the skilled interpreter who is necessary to-day. The argument that such a system would supplant the telegraph operator, or that it would bring into the field a cheaper class of talent is unprogressive, and not well founded. We can hardly conceive such a contingency. The operator would undoubtedly be as necessary an adjunct as he is to-day, and his field of usefulness broadened. We have only to refer to the linotype machine operator, as compared with the case compositor to confirm this conclusion.

It is obvious that the commercial requirements of to-day call for a printing telegraph system. There are many such systems in various stages of perfection, some of them operative, but for some reason which cannot be well understood, are not in actual service, and still others inoperative, intricate and unattractive. Of the first named we have the

stock ticker, a step by step system, which although slow in its operation is of great commercial value, and its use more general than that of any other system. Also the Phelps, Buckingham, Rowland and Hughes systems, the use of each being limited.

Of the other systems mentioned, operative and inoperative, I would refer to the Type-Telegraph, an invention of Dr. G. A. Cardwell. This system is of selective type, the transmitter being attached to the universal typewriter keyboard, and the permutator so connected as to directly operate a page printing typewriter. The operation of the keyboard at the sending end of the line, and of the typwriter at the receiving end are direct and simultaneous. This system has been operated by me successfully over grounded circuits, two hundred and forty miles in length, with ten intermediate Morse relays.

It is obvious that the gap between the present crude method of cutting up electrical currents into dots and dashes through the use of the manual key, deciphered by the skilled interpreter, and the ideal method before outlined, does not reach any great proportions; that two conditions must exist in order to attain our great ideal in the automatic transmission of intelligence, rendered in printed form. We must not concede that the great possibility has been met with in the Morse system. We must be liberal with inventive genius, placing at its disposal every available facility at our command.

DISCUSSION.

Secretary Drew: We have a committee on the typewriter in railroad service of which Mr. Darlton is chairman. Mr. Selden and Mr. Willliams are members of that committee.

Mr. Selden: Owing to the ill health of our chairman, the committee has not been called together during the year. However, it had nothing to do with the printing telegraph; it had to do with the use of the typewriter in railroad service.

Individually I have gone into that to a certain extent. The greatest objection raised by railroad superintendents were that where the impression of the type was not very clear, the three and the eight might be confused, the "8" might be taken for the "3" and vice versa, if the type did not strike exactly square. The Remington people have evidently met with that objection. In the new machines furnished for the telegraph service, the top of the "3" comes about to the middle of the "8," while the "5," to keep it from appearing like the "3," has a straight top on level with the line. In other words, taking the horizontal line across the tops of the figures as the basis, the "8" would be above the top of the horizontal line and the "5" would be to the top of the horizontal line, which distinguishes it quite plainly from the "8," while the "3" comes to the top of the horizontal line, but extends below the writing line.

I have tried to get that effective on our railroad, but the management thought best to have the train orders still taken in the old way. They found, however, that possibly ten per cent. of the operators had typewriters and were using them for train orders. I do not know whether any of the other members of the committee have any information on the subject or not.

With reference to the printing telegraph referred to in the paper of Mr. Wells, I have seen it in operation at Long Island City and I was very much impressed with it. I have heard rumors of a printer that is a little bit more rapid and a little bit less complicated. It may be in use on some circuit. I am not at liberty to give any more information because it was given to me confidentially. It is quite an interesting thing to go into the room and find a typewriter banging away there, moving itself back without anybody being around to make it go. When I saw it, it was in its earlier stages, but even then the inventor had quite thoughtfully arranged the receiving instrument so that it would ring the bell at the end of the line although there was no one there to notice it.

President Hope: There is one more member of the committee, Mr. Williams.

Mr. Williams: I have no further information in regard to it. My understanding is that the American Railway Association had the matter under advisement and would change the rules so as not to interfere with the typewriter if any road wished to use it. I understand there is no objection to it from the American Railway Association.

President Hope: I would think there would be quite a serious objection to it if the figure "8" is liable to be taken for the figure "3," especially in engine numbers.

Mr. Selden: That is done away with, Mr. President, by the Remington people, and I presume the new machine may be ready now .

President Hope: Do I understand that the figure "8" would be a little up; that would make an uneven row of figures?

Mr. Selden: I don't know that I expressed it exactly. I will try and show it in another way. A figure "8" that was written on the line on one side would look like a figure "3," but the figure "3" may be brought up like the French (illustrating), which makes it plain, as you see. The "5" is plain, but instead of being brought above the line it is even with the line straight across the top. In fact, you can't make an impression of it that will make it look like the figure "8" and it would never be taken for a "3.". It is what we term the old French "3." It is perfectly clear. It would never be misleading and it is the Remington machine which has brought this out.

President Hope: Would not that interfere with the space between lines?

Mr. Selden: Not at all. I do not know whether it is patented or not. It might be. I don't know only that they have the machine.

President Hope: Is there any further discussion on this paper by Mr. Wells, have other members anything to say? We will now close the discussion on Mr. Well's paper and

call upon Mr. Maver, a paper on "Recent Improvements in Wireless Telegraphy."

Mr. Maver: I had thought that the time of the members would be so fully occupied that it would be perfectly satisfactory to publish it in the transactions where you can read it at your leisure. Of course, I can read it if you have time.

President Hope: How is the time, Mr. Secretary?

Secretary Drew: Our time is a little limited, Mr. Maver. If it will be satisfactory to you, I really think it would be advisable. We have quite a little discussion yet on the composite.

President Hope: I thank you very much.

IMPROVEMENTS IN WIRELESS TELEGRAPHY.

By Wm. Maver, Jr.

Since I had the pleasure of addressing you at Wilmington, N. C., in 1898, on the subject of wireless telegraphy, that art has made some notable advances. At that time the maximum signaling distance was about fifty miles, and the only receiver or detector in use was the filings coherer, which operated a Morse relay, that in turn operated an ink recording Morse register in the well known way. The height of vertical wire, or antenna, as it is now frequently termed, was about one hundred feet.

Not long after that time Marconi and others repeatedly succeeded in transmitting signals over distances separated by one hundred to one hundred and fifty miles, which distance was increased to over two thousand miles by Marconi in 1902, in his trans-Atlantic experiments—experiments they must be termed since commercial trans-Atlantic wireless telegraphy is not yet an accomplished fact.

It will be remembered that the detector used by Doctor Hertz in his notable experiments that led up to the discovery of electric waves in free space, consisted of a circle of copper wire about sixteen inches in diameter, which device was termed an electric "eye." With this receiver Doctor Hertz detected signals at a distance of eight or ten feet. I re-

marked at Wilmington that had the progress of wireless telegraphy stopped with the Hertz detector, the utility of electric waves for the purposes of telegraphy would have been very limited; but fortunately it did not rest there, inasmuch as the discovery of the Branly filings coherer had increased the distance at which signals could be detected to forty or fifty miles.

I might now say that while improvements in the make-up of the filings coherer, together with an increased number of and height of vertical wires render it possible to receive signals by this form of detector a distance of over five hundred miles under favorable circumstances, still had there been no other receiving instrument than the coherer, important as that improvement is, there would have been comparatively little progress to note relative to the speed of transmission by wireless telegraphy, which with the filings coherer may be placed at from eight to twelve words per minute. The action of the coherer is sluggish in the production of perfect signals; the cohering and "tapping back," together with the inertia of the apparatus used in connection with the coherer as a receiver, all tending to that result. (It may also be noted in this relation that in ordinary ship-board practice to-day the distances signaled over with the filings coherer does not much exceed fifty or sixty miles.) It was therefore very desirable that an automatic detector of the electric waves should be devised; that is, a detector which would "close," so to speak, during the time that the electric waves are setting up oscillations in the receiving circuit, and should "open" when the oscillations cease, or vice versa, and thus give a more rapid receiving instrument. As usually happens in such cases a device of this kind was not long in forthcoming.

It was probably Solari, an Italian, who first succeeded in producing a practical auto-coherer. His device consisted of a tube resembling that of the filings coherer, with metal rods leading into the tube. To the inner ends of these rod pieces of carbon are attached, and in the small space between the carbons is placed a drop of mercury, connecting the carbons.

During the occurrence of electric oscillations in the circuit, the mercury and rods cohere, and upon the cessation of the oscillations, decoherence at once takes place automatically. The connections are the same as for the filings coherer, except that a telephone receiver takes the place of the Morse relay, the signals being received as long and short sounds in the telephone.

Marconi used this coherer in his first long distance experiments. He has more recently devised a magnetic detector, which, in brief, depends for its operation upon the fact that electric oscillations facilitate the demagnetization of a magnet, which is undergoing slow changes of magnetization, the result being that at such times currents are set up in a telephone circuit, practically as in the case of the Solari detector.

DeForest and Smythe in this country, improving upon the Neugschwender and the Schaefer devices, have also devised an automatic detector, or "responder," termed an anti-coherer, because of the fact as it were, at the cessation of the oscillations. This instrument consists, briefly, of a tube containing the usual metal rods, between the ends of which a viscous substance such as glycerine is placed. Small particles of filings of metal are suspended in this liquid. There are a small battery and a telephone receiver in this circuit. Normally, under the influence of the small battery in the coherer circuit, the filings bridge or pontoon, the gap between the rods in the tube, and the resistance of the battery circuit is lowered. The effect of electric oscillations in the circuit is to break up or disrupt the conducting bridge, with the result that the resistance of the circuit is largely increased; this, as in the other cases cited setting up sounds corresponding to dots and dashes in the telephone receiver.

Another auto-detector is that due to Fessenden. This is a thermic detector, consisting briefly of a very short thin piece of platinum wire placed in a circuit with a telephone receiver and battery. Received electric oscillations produce

momentary variations of heat in the detector which variations increase the resistance of the circuit and thus again sounds are heard in the telephone. Modifications of the last named detectors consist of one or two very fine wires placed in a slightly acidulated solution, which gives highly favorable results.

The variations of current in these detectors due to arriving signals are very minute and in the majority of cases would not operate a relay, hence the necessity for employing the telephone receiver, which is one of the most sensitive of electrical instruments. Unlike the filings coherer, however, these auto-detectors give no record of the messages received. But by the use of auto-coherers the rate of signaling is increased to virtually the speed of Morse telegraph, namely: thirty to thirty-five words per minute at distances of over 200 miles, at least. In addition to this the greater sensitiveness of some of the auto-coherers makes them responsive to weaker oscillations than is the filings coherer, and hence by means of such auto-coherers longer distances are covered with a given height of vertical wires and a given power at the transmitting station.

For signaling over distances ranging from fifty to seventy-five miles, two or three vertical wires, eighty to one hundred and twenty-five feet in height, and a ten or twenty inch spark induction coil are sufficient. For very long distances twenty to fifty wires, over two hundred feet in height, and generators capable of developing ten to twenty horse power, at each station, with the most sensitive detector available, and tuned circuits, are employed. By tuned circuits is meant transmitting and receiving circuits in which the resistance, capacity and inductance of the circuits are equal. This brings about a condition in which the electric oscillations in the respective circuits will be of the same periodicity; in other words, of the same wave length, or of the same number of oscillations per second, analogously as two tuning forks of exactly equal dimensions will vibrate at exactly the same rate. The resistance, capacity and in-

ductance of the electric circuits correspond to the physical properties of the tuning forks, namely: molecular friction, elasticity and inertia, respectively. And as it is well known that when one tuning fork is set into vibration in the neighborhood of a similarly tuned fork it will resonantly excite vibrations in the other fork, so, by the tuned arrangements of the circuits mentioned, the property of electrical resonance is utilized; and by its means greater distances are reached. Also, unless tuning forks are of similar dimensions they will not respond to air waves set up by the neighboring fork. So likewise is this measurably true of wireless receiving circuits, but when they are in tune they do respond. It is hoped that by taking advantage of these properties of electric circuits selective wireless signaling may be accomplished, but thus far the hope has not been fully realized.

So far as the application of wireless telegraphy to moving trains is concerned, it is obvious that high vertical wires are out of the question. Marconi, however, has had successful results, using metal cylinders eight or ten feet high, which might be available on railroad trains. (Fully described in Maver's Wireless Telegraphy.)

This, however, brings up the whole question of telegraphing to and from moving trains, which is not a new question to the members of this Convention, however new it may appear to the newspaper press when any more or less new experiments of this nature along the route of some railroad are announced. Of course, wireless telegraphy, if otherwise satisfactory for this purpose would have the advantage of not requiring wires along the track, nor special arrangement of circuits on the cars. If it does not possess these advantages one might as well go back to the Edison-Phelps systems. Perhaps wireless telegraphy, when secured, will be more suitable for this purpose.

In the meantime wireless telegraphy is proving its utility in many places, as on shipboard, on lighthouses and lightships; also between points where the maintenance of cables

would be impracticable. One of the latter uses may be cited, namely, the recent installation of a wireless telegraph system between Port Limon, Costa Rica, and Bocas del Terro, Panama, a distance of about one hundred miles, which has been in successful operation for several months.

Mr. Selden: Mr. President, I have no paper, but I have something that I would like to call the attention of the Convention to.

TELEGRAPH INSPECTING.

Some two years ago, our railroad inaugurated a telegraph inspection that combined the telegraph, the interlocking signal, and the insurance departments. They visited every telegraph office, going through it thoroughly, and the signals. They tested every point and the insurance people viewed the property with reference to its fire protection, to find any wastage or other things that are dangerous. It is true that a good many railroads would not do that. In the first place, their interlocking plants may not be sufficient to warrant it. The fire insurance people, however, I presume, get around once in a while. We have found this inspection of great value to us and it can be carried out without the special train and without taking thirty-three consecutive days, which we have to do on the October inspection because it takes that long to cover the railroad. We decided on a reduction of ten per cent. from one hundred per cent. for carelessness or remissness in any particular line. We blue printed the result of each division and sent the division operator and the division superintendent a copy. With his eye along the line he could at once see what took his division down the ten points. It means proficiency and we can tell not only in what office he has been reduced, but shows just what within that office caused the reduction. We prepared blanks to show the switchboard, the relay, the key, the sounder, the local batteries, the main batteries, the telephone office clearance, and then there was the column for remarks. If we found the outside wire coming into the office

BALTIMORE DIV.

Inspected January 1903.

LOCATION	CALL	WIRING		SWITCH BOARD		RELAY		KEYS		SOUNDERS		LOCAL BATTERY		MAIN BATTERY		TELEPHONES		CLEANLINESS	AVERAGE	REMARKS
		Outside	Inside	SIZE	POINTS	No	POINTS	No.	POINTS	No.	POINTS	No.	POINTS	No.	POINTS	No.	POINTS			
Brought forward				62		224		223		225		356		121		80				
Frederick Frt. Office.	FD	0	5	4 x 5	5	1	10	1	10	1	10	2	10					10	75	
Lime Kiln	KI	0	0	6 x 7	10	2	10	2	10	2	10	4	5					10	69	
Adamstown	AS	10	10	8 x 9	10	2	10	2	10	2	10	4	10					10	10.	1 Box Relay K.O.B.
Adamstown Crossover	AX	10	10	6 x 7	10	2	10	2	10	2	10	4	10					10	10.	
Washington Jct.	KS	10	5			7	10	6	10	6	10	12	10	30	10			10	93	1 Box Relay K.O.B. will rerun office.
Washington Jct Tower	KG	10	5	8/8 x 8/8	10	5	10	5	10	5	10	6	10					10	94	
Point Rocks Tunnel	PW	10	10	6 x 7	10	3	10	2	10	2	10	4	10					10	10.	1 H.L. Sounder T(?)
Point Rocks Tunnel West	PI	10	8	6 x 7	10	3	10	2	10	2	10	4	10					10	97	K.O.B. Box Relay.
East Brunswick	BN	10	0	8 x 9	10	3	10	3	5	3	10	4	10			*6	10	6	79	9 I.E.E. Tel.-1 I.E. Dial-1 K Box-1 S Box-1 Frt. Shed-1 M.E. Dial.
Brunswick	UN	10	5	22/6 x 23/7	10	9	10	8	10	8	10	16	10			*2	10	10	94	*1 Box Relay K.O.B. 1 Tel. Off.-1 Round House.
Brunswick West	WB	10	10	16 x 17	10	7	10	6	10	6	10	12	10			1	10	10	10	1 Box Relay K.O.B.
LOCUST POINT BRANCH																				
Chamber of Commerce	VA	10	10	8 x 9	10	2	10	2	10	2	10	4	10							
Yd. Master Off Locust Pt.	PI	10	10	16 x 17	10	5	10	5	10	6	10	8	10			*14	10	10	10.	*2 Pr. Off.-1 Car repairers Off.-3 Upper Repair Yard-3 Engr. Off.-1 Asst. Master Car Repair Yard-1 Tel. Switch Off.-1 Pier 8.
Elevator Off Locust Pt.	EW	10	10	6 x 7	10	2	10	2	10	2	10	4	10					10	10.	
Riverside	RV	10	10	12 x 13	10	5	10	5	10	4	10	5	10			*10	10	8	98	*4 Tel. Off.-2 Round House-3 Tel. Off. 1 Wash's Room.
Mt Clare	MC	10	10	8 x 9	10	4	10	4	10	4	10	8	10			* 8	10	10	10.	8 Car Repairers Off.-1 M.C. Yard-3 Store Keepers-1 M.C. Supt.-1 Table-1 Car Inspectors Office.
Mt Clare Jct.	JN	10	10	14 x 15	10	6	10	6	10	6	10	12	10			* 6	9	5	93	2 Yard Off.-2 Calhoun St.-1 Scale House-1 Round House.
Claremont	SX	10	10	14 x 15	10	4	10	4	10	4	10	8	10					10	10.	
Camden Elevator	FA	10	10	4 x 5	10	2	10	2	10	2	10	4	10					10	10.	
CURTIS BAY BRANCH																				
Clifford	CF	10	10	8 x 9	10	3	10	3	10	3	10	6	10					10	10.	
Sea Wall	ZA	10	10	8 x 9	10	2	10	2	10	2	10	4	10			*1	10	8	98	1 Sea Wall Jct.
Curtis Bay	C	10	10	6 x 7	10	2	10	2	10	2	10	4	10			*3	10	8	97	1 Shops House Conn.-1 Mr Browning R.E.S. 1 C. Bay Pict.
SHEPHERDS BRANCH																				
Potomac Jct.	BN	8	10	4 x 5	10	1	10	1	10	1	10	2	10			2	10	8	96	
Shepherd	HD	5	8	6 x 7	10	1	10	1	10	1	10	2	10			1	10	5	86	
Washington Co BRANCH.																				
Gapland	JA	5	10	6 x 7	10	2	5	2	10	2	10	4	10					10	88	
Keedysville	KD	5	0	6 x 7	10	2	10	2	10	2	10	4	0					10	68	
Rohrersville	RO	8	0	4 x 5	4	1	10	1	10	1	10	2	10					10	78	Will rerun inside.
Hagerstown Sta.	HA	8	5	4 x 5	0	2	10	2	10	2	10	*4	10					10	78	Will rerun inside.
Hagerstown Frt. Office	AX	10	5	2 x 2	10	1	10	1	10	1	10	2	10					10	94	Will rerun inside.
Total				92		315		308		311		515		151		134				
Average Points.		8.7	8.1		9.6		9.8		9.7		9.9		9.7		10		10	9.4	9.4	*NOTE: 10 Points perfect.

in good condition we gave them 10. If their joints are bad we give them what percentage would show their skill. You find an office which is marked 10 out here and you will find that the relay, key, sounder, everything, were all in good condition. If, on the other hand, for instance, you find an office that runs 9 points or 6 points, you look along the line and see why it is not marked 10 and you find it is on account of the clearance, and so forth and so on. The effect of this is that the superintendents vie with each other, keeping after their chief operators to see that those come out. As they go over their divisions, these results have been found..

By taking the time to examine these offices and looking around, we found battery material and wastage in many respects. We found another thing, that they had so many zincs on hand at times, that they never cleaned the zincs, but to save the trouble of cleaning the zincs, they bought a new supply and buried the old ones under some cinders, only in one case they didn't get the ends of them quite covered. We found things virtually scattered about where they didn't expect you would go to investigate. We found in some instances operators who had three sets of locals. They would take four cells and put them in multiple and that relieved them of the cleaning the two cells when the batteries got weak, and when all the locals got weak, they had to clean them. This putting of them in multiple is a question we are now testing.

If any of the superintendents will take up something of this character with an interest, making an inspection every so often and will make a record of it when he is through with his inspection, he will find the greatest sort of benefit from it and will secure a lot of information that will surprise him.

President Hope: Gentlemen, you have heard this interesting talk on inspection, by Mr. Selden.

Mr. Ryder: I would like to ask Mr. Selden as to the personnel of this investigating committee.

Mr. Selden: You mean of the inspection party?

Mr. Ryder: Yes, sir.

Mr. Selden: The superintendent of telegraph and the executive manager, or the superintendent's assistant, of the entire system; the division superintendent, when you strike his division; the engineer of the division; the division operator; the division superintendent of signals and each signal inspector and the superintendent of insurance and his assistant, to inspect the fire insurance protection.

We have so many inspections that our company has made a very nice arrangement. They have built a car which they term the "annex car." The forward end is taken up with a very large refrigerator. It contains bath rooms, and is in eight sections. We take a private car, too, if necessary, and, of course, the whole crowd may use the observation end of the private car. On this last trip we covered 2,260 miles. Sometimes we had 24 people for dinner and could only feed ten at one time, the other ten had to wait for second table. We had two shifts for the meal.

The signal superintendent makes out exactly the same kind of a statement, reporting every tower and every switch and the condition of each one of them. The insurance inspector notes when there is provided a receptacle for water or whether they have neglected the water proposition entirely, or whether they have piled a lot of old boxes or rubbish about the station, and whether the station is clean or not. He also investigates the freight condition. We found a number of loose connections in the switchboards. We found many places where they had stuffed papers behind the wires. But if you will go in some sort of a system, even if you do not take a special, and run it down and you will let your superintendent see that there is the office and that is what is the matter.

Mr. Miller: How did you find the local batteries?

Mr. Selden: The local batteries we found in good con-

dition, my reports will show that. We make several books sending them on to the general manager and division superintendent.

I would say, Mr. Miller, that 75 per cent. of the locals were in good condition. We found that when we would strike a junction point, I would say, "You have got enough zinc here to run you two or three months." * * * That is the Western Union. I have recently written the Western Union officers with a view to arrange for one company to furnish all of these supplies.

President Hope: I would like to hear from the Committee on Cipher Code, and will call upon Mr. Rhoads.

Mr. Rhoads being out of the room at this time, the report was postponed.

Secretary Drew: We have one paper that is, as you all know, on the way. It is by Mr. Roome, and it is on Pacific Coast telegraph conditions. We will put it in the minutes. We cannot read it because it will not be here in time.

Mr. Jacoby: I understand, Mr. President, that the composite is to be discussed further this morning. If in order, I would like to change an impression that may have been made in our session last evening. I would like to state here that the Lehigh Valley are not issuing any orders or moving trains in any haphazard way by telephone. The work trains are kept out of the way of first-class trains by those means. We have a double track road with automatic signals provided, and the work trains, when nearing the time of a first-class train, call up and find out how it is running; if, say, half an hour late, they will use twenty or twenty-five minutes of that trains time, putting out a flag which holds everything that comes along, thus making it perfectly safe. The only question will be the possible stopping of a first-class train and the delay to it. There is no element of danger in it and the advantage had is that these work trains, with a hundred or more men, get more work done. I simply wish to correct an impression that may have been made yesterday in regard to running trains in a haphazard manner.

President Hope: I would like to hear from the Chairman of the Committee on Cipher Code.

Mr. Rhoads: Mr. President, Gentlemen, the Committee on Standard Cipher Code has had no meeting. We did not consider it necessary owing to the fact that the previous work of this Association bore fruit, from the fact that we turned the matter over to the American Railway Association, and their action at the annual meeting in New York was such as to show for itself how the matter is proceeding. For the benefit of those who are not familiar with the proceedings of the American Railway Association, I might state that they made a report which was adopted. In that report statement is made as to the great volume of work that they had gone through with, and they had provided a code that contained six hundred pages 4½ inches by 7¼ inches in size and is to be bound in flexible leather, with room for more specially adapted to each road. We adopted their report and the American Railway Association voted to authorize an expenditure of $6,500 to complete the printing of this book. Mr. Peterson, General Superintendent of the Southwestern System of the Pennsylvania is chairman of that code committee. In regard to the size and expense of this code that they are getting out, it seems that at the beginning some one took exceptions to it owing to the fact that it took in all the different departments of the railroad service; they had considered that they had only the operating department and that it was going beyond what was wanted, but Mr. Peterson made a statement that the instructions of the Association to the committee were that it was to prepare a code which would meet the requirements of all branches of the railroad service, so they have provided for the freight traffic, passenger traffic, freight claim, and even the car service departments, as well as the operating. After all these statements were made, the report was adopted so that I presume that before we meet next year, we will have adopted and in use this standard code.

Secretary Drew: We have quite a number of committees to appoint and I would like now to suggest, if it is in order, that Mr. Lang and Mr. Torrey be requested to name a local entertainment committee and furnish me with their names in time to be published in the minutes. If that will be satisfactory to you gentlemen, it will save us taking any other action here, and if they consent, I make that suggestion, Mr. President.

Taken by consent.

Secretary Drew: There is a committee that has been provided for that was not named, that was the Committee on the Use of the Telephone for Train Orders, to be presented before the American Railway Association, and I think that committee ought to be named right away.

President Hope: The Committee on the Use of the Telephone for Train Orders, in connection with the American Railway Association,—C. Selden, E. P. Griffith, and J. H. Jacoby.

President Hope: The Committee on Topics,—

Secretary Drew: I think we can just make Mr. Ryder perpetual member.

Mr. Ryder: I may have a little to say to that proposition; I absolutely decline.

Secretary Drew: If it would not be out of order, Mr. President, I would suggest that these committees be named by the president and published in the minutes, as it takes a little time for him to select them, and perhaps it is just as well if we can leave that matter now and give him the time as he has just taken the chair. I move that the formation of the committees be left for the President to fill at his leisure and be published in the minutes.

Seconded and carried.

Secretary Drew: Mr. President, I have an announcement to make now, and that is that we are requested by Mr. Maiden that we make the Indiana State Building our rendezvous at St. Louis. He extends that invitation and says that you can be accommodated at the Indiana State Build-

ing. We also have an invitation from Mr. Eckhart that those who wish to can be accommodated at the exhibit of the Safety Insulated Wire and Cable Company in the Electricity Building. Also, Mr. Vogel tells us to visit the Railroad Supply Company's exhibit in the Transportation Building. All of these places have chairs and tables and accommodations.

Mr. Selden: I would like to add, Mr. Secretary, that the Baltimore and Ohio Railroad would be very glad to extend courtesies of their office to you. You will find the exhibit quite a nice place to leave your wraps, etc.

Secretary Drew: It seems to me, Mr. President, that we might occupy the rest of the time on the continuation of the discussion of the composite business. We would like to get in all the time we can with Mr. Fowle, the time was rather short yesterday and, if it would be in order, Mr. President, I would move that he give us a little more on that topic.

President Hope: We would be glad to hear from Mr. Fowle.

Mr. Fowle: Referring to the use of these grounded, composite lines in connection with exchange service, I would like to explain some of the difficulties in the way of such service. The connection of these lines into private branch exchanges of the magneto type is much more readily accomplished than in the case of common battery exchanges. The excessive foreign currents, due to induction and leakage, are likely to affect other circuits in the switchboard or in the same cables with the composited circuit. The private branch exchange stations used to talk over the composited line need shunted receivers, for satisfactory service, and this reduction of receiver power places a large handicap on these stations when used to talk over the public toll line system,—rendering fairly long distance service out of the question. In addition to this feature, the switchboard has to be equipped with the special ringing apparatus used in the railway composite system. When the common battery system is used, additional difficulties appear in the use of repeating coils and the provision of means for preventing

the unbalance of common battery circuits connected to the composited circuits. There are a few instances where these lines have been connected to magneto boards successfully. The criterion in any case is the decision of the local Bell Telephone company as to whether it desires to have such lines connected to private branch exchanges, which are connected to the public exchange system. I think it is evident that connection from the composited line through the private branch exchange to the public exchange and thence to some public or private station would be so likely to impair the quality of the public exchange service that such connection should not be permitted. The shunting of the receivers, in its effect on the long distance service, is an inconvenience which has to be agreed to. I believe Mr. Ryder has employed this scheme on his road.

Mr. Ryder: We had to do that with every station in common battery exchanges that we wished to connect with a composite line.

Mr. Fowle: We are now provided with standard equipment meeting the needs of this service. I think it can readily be designed, although the variation of local conditions about the country might require special equipment in some instances. If there is a demand for the service we shall be pleased to consider the matter of getting out the equipment to meet it. I would like to speak, in this connection, of the limitations on the railway composite service, as shown by our experience in the last year and a half. We have found that the limiting distance of satisfactory service on No. 9 B. & S. copper wire is 200 miles when there are no intermediate telegraph offices; each intermediate telegraph relay is equivalent approximately to 10 miles of line. That is, a line 160 miles long with 4 intermediate relays would work as satisfactorily as 200 miles with no intermediate relays. The limiting distance on No. 8 B. W. G. iron, of B. B. grade, is 100 miles when there are no intermediate relays; each intermediate relay is equivalent approximately to 5 miles of line. That is, a line 70 miles long with 6 intermediate telegraph

relays would work as satisfactorily as 100 miles with no intermediate relays. These distances have been exceeded in the far west, where the atmospheric conditions are far more advantageous. We do not advise the use of many sets on one line, placing the limit at 4 or 5. Where there are too many stations on a line, the ringing signals become complex and cumbersome, it is generally difficult to get the station called without calling twice, there is less privacy and there are frequent responses to calls by the wrong station. Mr. Selden spoke of the ringing apparatus as requiring the most attention. The proper adjustment of the relays and the vibrating bell is a vital matter. The vibrating bell should be adjusted to respond loudly and clearly, when the armature of the slow-acting relay releases; the armature may be pulled back by hand while adjusting the bell. The clapper on the bell should, in its normal position, be a small fraction of an inch away from the gong and the bell circuit should be cleanly broken just before the clapper strikes the gong. The retractile spring should have only a moderate tension, and all nuts should be set tight. The slow-acting relay may be made slow or quick in its action, according to the intelligence with which it is adjusted. This relay is provided with three adjustments,—the front and the back stops for the armature and the leverage of the retractile spring. The front stop should be released until the armature strikes the pole piece, and then advanced only enough to clear the armature from the pole piece very slightly. The back stop should be adjusted to give an armature play of about 1/32 of an inch. The slotted brass arm, held to the armature under a screw head, should be lowered and the retractile spring weakened until the armature has only sufficient pull to cause it to fall back when the polarized relay responds to the ringing current; undue pull on the armature will increase the rapidity with which the relay responds and tend to nullify its purpose. The polarized relay has two adjustments,—a back stop at either end of the armature. The pivotal

bearings should be tightened until the armature is fast, then released very slightly until it moves freely without play, and then the lock-nuts should be tightened. Advancing one back stop and withdrawing the other tilts the armature to a position slightly away from the vertical, giving it what is termed a "bias." The term "bias" is given when the armature is in the position described because one air gap is longer than the other and the permanent magnet exerts the greatest attraction at the end of the armature having the shortest air gap. The play of the armature should be between 1/64 and 1/32 of an inch. In adjusting the armature it should be given considerable bias initially, and this bias reduced, if necessary, so that the vibrating bell will respond to a call from the most distant station. Whether or not the polarized relay responds to the telegraph impulses, the effect on the telegraph working is the same. Further, the very design of the mechanism is intended to avoid the response of the vibrating bell when the polarized relay responds to the telegraph impulses.

Mr. Ryder: That, of course, is a subject entirely for the agreement of the local people, but I think that all of us recognizing the character of the local relay composite service, are perfectly willingly to agree that we will not connect those lines with the public service in any way. Now, so far as the objections raised by the telephone people go along that line, that is the only point that they insist on. If we are satisfied with the service, either on isolated lines or using the P. B. X., they are willing that we shall have that service though they do not want what they consider an inferior service to be thrown in connection with their public service. Now, so far as the demand for this particular feature, that is, the connection of the composite line through the P. B. X., is concerned, I can simply give you my idea of the proposition. It might apply to everybody else here, but to me it represents a certain amount of local telephone service that we cannot get otherwise. I believe that we are going to handle our general telephone service the way

that we handle our telegraph service; that is, we will have through wires and local wires, the former connecting up the private branch exchanges at the different points and the local wires from these branches to the local offices reporting to each individual division point. Now the general equipment of the railroads may not have the requisites for connection with the local offices. Very often there are times when it may be very convenient if that connection could be used and if a satisfactory service could be secured through the railroad composite system. We would get local service just that much quicker.

A Voice: I might make a suggestion, Mr. President, with regard to what we now call the composite system. It is with regard to the name "composite system." I do not think that I ever knew of a term that was more inappropriate to use than "composite" is for simultaneous telegraphy and telephony. A composite is anything in which the different ingredients or components are blended together so that you can scarcely detect one from the other. The great consideration in telegraphy and telephony is to have the two systems distinctly apart and they appear a composite system when they work so closely that you cannot tell which is the telegraph system and which is the telephone system. I think that it would really be a good piece of work on the part of this body to have used the name of simultaneous telegraphy and telephony before "composite" gets so deeply rooted that it would be impossible to dig it out. The term "telegraphone system" would describe it. There are objections to that name because it has been adopted by private corporations. I make that only as a suggestion.

Mr. Fowle: Concerning the term "composite:" it has been in use among the telephone people for about 15 years. The sense in which the word is used is that the actual line current, in simultaneous telephony and telegraphy, is composed of two real components, these components being separated at the ends of the lines. The components form a single current in the line, but are practically separate at the

terminals. The term telegraphone has been applied to an electromagnetic phonograph invented by Poulsen; it has also been applied to the composite telephone apparatus made by an independent manufacturing company. There may be theoretical objections to the term composite, but it seems to be firmly established by general use.

Secretary Drew: We have got quite a little rounding up to do in the next ten minutes. I move you, Mr. President, that the usual courtesies be extended to all who have favored us during this Convention, and we will specify them in the minutes.

Seconded and carried.

President Hope: This has been a very interesting subject for the Committee on Composite Circuits. Some one has suggested, I believe, that the heading of this committee ought to be changed, making it the Committee on Simultaneous Telegraph and Telephone Circuits. Do you want to change the name or had you rather have it the Committee on Composite Circuits.

A Voice: I think you had better leave it as it is, Mr. President; it is established practically now under that name by the largest telegraph and telephone companies. They will never know what you are talking about when you call it by some other name.

President Hope: I am sorry we have got to close up this business now. There is a gentleman here who is very much interested in this subject, and that is Mr. Freeman; we will have time to hear him, I guess. Mr. Freeman, of Armour Institute, Chicago.

Mr. Freeman: Mr. President, I did not expect to be called upon to talk; I came here to learn. I had the pleasure of meeting with you some years since at Washington, and I am very much gratified to note the distinct improvement in the class of discussion and the papers that have been presented. I am particularly interested, too, in the innovations that the telephone seems to be making in the telegraph service. You gentlemen who have been closely connected with

telephone work in general in the last few years will not be surprised to hear that the amount of money invested in the telephone industries all over the country and the earnings of the corporations are almost identical with those invested in incandescent light. With this investment in money and with this amount of energy and ability invested, it does seem strange that our educational efforts along this line have been so sadly neglected. There is one institution that has progressed much along this line and that is Purdue. Armour Institute has taken this matter up by offering, with the course in power and light, a four years' course in telephone engineering, which will embody the fundamental features of telegraph, telephone and signal work. That will have its interest to you in that it will probably furnish to you young men who have the technical side of the thing better than the great number who present themselves as candidates for work in your lines now. This matter is of particular interest because the transmission of intelligence is as much important as the transmission of speech. The developments along the telegraph line have been most marked in the last few years and will undoubtedly represent more complex apparatus, requiring a higher technical training, and I think it is the history of our labor organizations with whom you come in contact that the higher technical skill represented by these organizations the less trouble do they give. One of these ends would be a greater advance of the art and more skilled operators, in general, which will result in the removal of a great deal of the trouble. I thank you, gentlemen.

President Hope: Is there anything further to come before the Association before we adjourn?

Mr. Camp: There is a little matter that I was very anxious to see brought up. We have been having a number of applications within the past year or so from different power companies for the privilege of crossing our right of way with high potential from 50 to 70 thousand volts. I would like to find out what the other railroads are doing and what safeguards they have taken.

President Hope: The gentlemen have all heard Mr. Camp, and if they will make it a point to speak of it on our trip this afternoon, perhaps we will have more time.

Before adjourning, I want to ask each and every one of our members to take a little more pains in inviting in members, who are superintendents of telegraph, and who are eligible for membership. I want to see each and every one of you at Chattanooga, because we all know what a good time we will have. We will notify you of the appointment of the committees, by mail, later on.

Mr. Rhoads: Before we adjourn, a representative of the Circuit Protecting Relay Company is here. I thought that attention had been called to all the exhibits. He exhibits his and we have with us this morning Mr. McCullough, the train despatcher of the New York Central.

Mr. McCullough: I just wish to say that we installed this relay on our system, giving it a thorough test and found that it will adjust ground wires and close the circuits as it is claimed. We found no fault with it whatever. It will do anything it is claimed to do.

Mr. Wright: I would like to say that the device has also been tried by the Buffalo, Rochester and Pittsburg Railroad, Mr. J. H. Barrett, General Superintendent. It has been fully approved by that line and will be installed. In this device, all the work is done by the little switch at the side of the case, which controls all the wires. We are here inviting the criticism of all the superintendents who will look into the device, and we will be glad to have any suggestions that they will give us.

President Hope: Mr. Selden, you were out when the committee was appointed to meet the American Railroad Association. The chairman is Mr. C. Selden. This for your information.

Mr. Rhoads made a brief announcement regarding the Belt excursion. Motion to adjourn made, seconded and carried.

President Hope: The meeting is adjourned.

PACIFIC COAST TELEGRAPH CONDITIONS.

By A. E. Roome.

San Francisco, June 11th, 1904.

Gentlemen:

I should never have developed the temerity to respond to the request of our energetic Chairman of the Topic Committee for a paper on Pacific Coast telegraph conditions had not that gentleman vaguely intimated that aside from occasionally clearing the wires of stray orange blossoms and rambling roses, the lot of a telegraph man in California must indeed be happy one, free from the problems and worries confronting the fraternity elsewhere.

Except so far as they may have a bearing on the operation of the telegraph it is not my purpose to describe the physical characteristics and climate of this great state, as a careful reading of our passenger department literature will provide those interested in the subject with all the reliable information desired.

The character of the country through which a telegraph line passes plays an important part in its operation, and when one considers that the climate and topography of California are as varied as her resources, it will be appreciated why many of the conditions met with on the Pacific Coast differ only in degree with those encountered by telegraph and telephone men elsewhere. Although it is true that cyclones, blizzards and tornadoes are not as yet on our list, still many of the causes contributing to wire interruptions on the Atlantic Seaboard and Middle West are not unknown to us, and, in time, possibly we may have those very interesting visitors also, as almost everything else can be produced in California. It may not be generally known that the highest and lowest lands in the United States are in California, but as we have no telegraph communication with Mt. Whitney's peak, we are satisfied to enjoy the unique distinction of maintaining an overland telegraph line 263 feet below sea level. Where but in California would it be possible to have gangs at work restoring poles and wires

that had been completely destroyed by great snowslides, as happens frequently in the Sierra Nevada Mountains, and but a comparatively short distance away find linemen engaged in the pleasanter but not less important task of trimming clear of the wires the branches of heavily laden orange trees.

Owing to the character of about fifty miles of the mountain region it is extremely difficult to maintain the overland telegraph leads across the Sierra Nevada Mountains during the winter months, and in that particular section we sometimes suffer the loss of many hundreds of feet of line caused by great slides of snow and rock carrying it away. To provide for the prompt restoration of the circuits there is kept at safe places along the line 19-conductor aerial cable, in half-mile lengths and, when required, is reeled out over the snow and rock and connected up by a few men in surprisingly quick time. This has been found to be a very simple and satisfactory method of providing a large number of temporary circuits until the pole lines can again be restored to service, and is a decided improvement over the usual method of stringing either bare or single covered conductors and attaching them to pieces of scantling, trees, or similar temporary support.

What has been, to me, at least, the most marked atmospheric condition to interfere with the proper working of telegraph wires is the Pacific Coast fog. This is particularly noticeable where our telegraph leads follow the coast line very closely, and whilst the causes that create these fogs are no doubt also responsible for the delightfully cool and bracing weather we mortals enjoy on this Coast during the months when others less fortunate are sweltering in torrid heat elsewhere, still we would be happier if the disturbing effect of fog on the working efficiency of telegraph circuits could be entirely overcome. Up to about eighteen months ago my sphere of activity was confined to a section of the United States where heavy fogs were not infrequent, but beyond producing a slight weather cross, causing the circuits to work "heavy," these were not considered a seri-

ous disturbing factor in the proper working of telegraph wires, nor do I understand that the fogs which appear for a few hours at certain seasons in the harbors of the Atlantic Coast cause any great trouble. Whilst the influence of the fogs is quite noticeable during the winter months, or rainy season, it is when the absence of rain permits the accumulation of dust and dirt on the insulator and fixtures during the dry months that the most severe wire trouble and consequent delay to the telegraph service is experienced. The fog usually rolls in from the ocean about sundown and the wires are completely enveloped until the vapor is dissipated by the sun or carried seaward by the shore winds the following morning. Although it is possible that the overhanging fog may cause a slight induction between the poles, this of itself, in my opinion, would not seriously affect the working of the wires. That the dirt on the fixtures (which becomes mud in a fog) is responsible for most of the trouble was fully demonstrated several years ago by the Western Union Company who had gangs at work for several weeks washing insulators inside and out, after which all the circuits were worked successfully for quite a while, or until the dirt was again deposited on the glass, pin and cross-arm. The same company some time afterward erected an aerial cable through this section, a distance of 35 miles, which solved the problem of fog interference, but developed a new one; malicious persons, frequently unsuccessful duck hunters, shot holes through this cable so often, rendering it worthless, that it had to be taken down. We have also tried insulated copper wire, but notwithstanding that the very best material was used it was found that the extremely dry weather cracked the insulation and the chemical action set up between the ingredients in the rubber covering and the salt fog caused rapid corrosion of the copper itself. This in connection with the constant wear of the wire at the insulator soon destroyed its effectiveness and after a few months had to be abandoned. Iron wire also deteriorates very rapidly in the fog districts and lately bare 210 pound

copper wire has been substituted. Just how long hard draw copper wire will withstand the effects of the Pacific Ocean fogs no one is yet in a position to say, but a microscopic examination of copper wires erected about eighteen months ago show that they have already been very badly pitted.

Thus far it would seem that we must either go underground, which is objectionable for various reasons, or maintain an overhead line, reduce the line resistance to a minimum and continue to suffer the loss of several circuits when fog is present during the summer months, until more effective measures can be adopted to eradicate the trouble entirely. To bring about the best results in the section mentioned above, we constructed a lead carrying six 210 pound coppers on an eight-pin arm, cabled all offices to the main lead and kept a very close watch on falling bark, overhanging trees, etc., etc. Since this line was completed last August the section through which it passes has been remarkably free from fog and the frequent rains have prevented the usual dirt deposits from remaining long on the fixtures, so I cannot therefore now say just what effect this will have on the working of the wires during fog. However, I do not believe that the improvement will be other than temporary.

At another point where the wind attains a high velocity and dense fog banks are frequent visitors, we constructed late last fall, a lead carrying three wires. On this line was placed a ten foot cypress cross-arm and a standard copper and iron placed at each end of same, and the third wire (a covered copper in fair condition) attached to a bracket on the top of the pole. Everything was expected of this arrangement, but all we can get out of it during a fog is a single Morse circuit. These wires are all fed from separate gravity batteries. The fact that the circuits in the district first mentioned are provided with dynamo current will no doubt insure their working much better than do these three wires during a fog, but I am free to confess that the spreading of the wires did not accomplish what was expected of it, hence my reason for believing that more radical methods shall have to be adopted if the lines are to be maintained

above ground in the fog territory. The subject is one of considerable importance to us and I hope the members will not hesitate to express their views.

In California, as elsewhere, where our telegraph lines are paralleled by electrical transmission lines carrying high voltage, our circuits suffer constantly from inductive effects, which tend to keep the telegraph service struggling along upon a very thin margin of efficiency, and this margin is frequently lost with disastrous results, as is well known to those who have charge of telegraph leads in close proximity to high tension lines. The current originally used by these power transmission companies, and still in use in many instances, is 15,000. But there is a constant tendency among them to increase the voltage, until now in at least two instances 62,000 volts is used, with increased impairment of the telegraph service, and if this voltage is increased either the telegraph or the power lines will have to move. These power companies usually deny that their lines are responsible for trouble in telephone and telegraph circuits, but I believe telegraph men generally agree that these high tension lines should not be granted the right to a position where their presence is a menace to the proper operation of telegraph lines.

Considerable difficulty is encountered at numerous points in the dry season caused by the ground in the vicinity of power houses, trolley car tracks, etc., becoming strongly charged by earth return currents. For six or eight months during the year the ground becomes so dry that it is incapable of absorbing or carrying away the immense quantities of high voltage current emptied into it by different users of electricity employing a ground return. Here the old axiom that the "Earth is a reservoir of electricity," carrying the meaning by implication that it is a reservoir of infinite capacity, must be modified to read that the earth is a reservoir of electricity which is liable to get full and over-

flow at any time except during a rain storm. Within a radius of several hundred feet of a trolley line power house, using the ordinary current of 500 volts, a telegraph wire attached to the earth and leading to what can be called a "good ground" at some distant point, will develop a current of from 15 to 200 volts. Now if this current were constant it might simply be regarded as a good thing in the way of free battery power, but it is variable, wavering and inconstant, fluctuating from high to low voltage, sometimes even reversing polarity, and in wet weather disappearing altogether. In consequence of this stray current evil, grounded locals, often so convenient upon quadded wires, become impracticable. Short pony wires must be made full metallic circuit, and frequently the ordinary station ground wire provided for every office cannot be satisfactorily found close to the station, necessitating the stringing of a ground wire sometimes for the distance of a mile in order to get out of the zone of earth currents. This latter method is especially necessary in cases where multiplex apparatus is used in order to insure a good working balance of that system. For instance, if a quadruplex attendant "grounds" for a distance office to take a balance, a defective ground may give the distance office 50 or 100 volts potential instead of a ground for him to balance against, it can be imagined with what result. Electric power and lighting stations contribute more or less to these earth currents, but in the main, a trolley station is the worst offender, owing perhaps to the large quantity of current employed in operating trolley cars.

EXHIBITS.

J. H. Bunnell Company, of New York, was represented by its President and General Manager, Mr. J. J. Ghegan, and by Jesse H. Bunnell, son of the founder of this house. A full line of up-to-date telegraph apparatus was shown, among them being the Leech combination resonator and

stand; the Ghegan automatic repeater and standard relays and sounders for railway and commercial service. There was also an exhibition of a new type of star zinc and hanger, and a new straight type line of line tapping clamp. This company also distributed souvenir match boxes, which were much appreciated by all who received them.

A sound magnifier for relays, the invention of Mat Hacker, of Irvine, Ky., was exhibited by C. P. Chenault, of Frankfort, Ky. The device is an attachment for main line relays, the purpose being to do away with local sounders and batteries.

An Adams-Randall composite circuit set was placed on view in full operation; the object of this device is to increase the initial energy of telephone currents to suit conditions and requirements.

Mr. C. K. Jones, of Quincy, Ill., displayed his automatic telegraph circuit protector and signaling machine. This ingenious apparatus recently received warm commendation from officials of the Illinois Central Railroad after its efficiency had been demonstrated by actual trial on the lines of that road.

Mr. E. W. Vogel, the electrical engineer of the Railway Supply Company of Chicago, Ill., whose products have an established reputation among railroaders, well represented his company in further bringing its manufactured articles to the attention of those interested.

Mr. A. P. Eckert, of New York, as is his annual custom, was present in the interests of the Safety Insulated Wire and Cable Company, the merits of whose output lost nothing in carefulness of explanation by his representation.

Mr. G. M. Dodge, of Valpariso, Ind., exhibited his automatic telegraph sender, a device which transmits Morse characters for learners, or those wishing to learn to copy on the typewriter from the instrument.

In Memoriam

ROBERT STEWART

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CENTRAL R'Y OF NEW JERSEY

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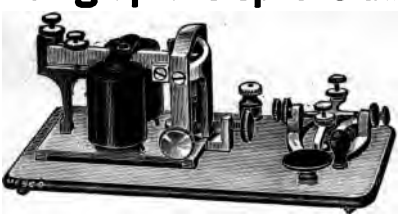

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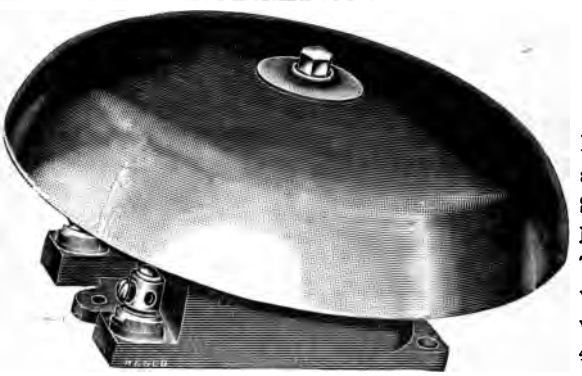

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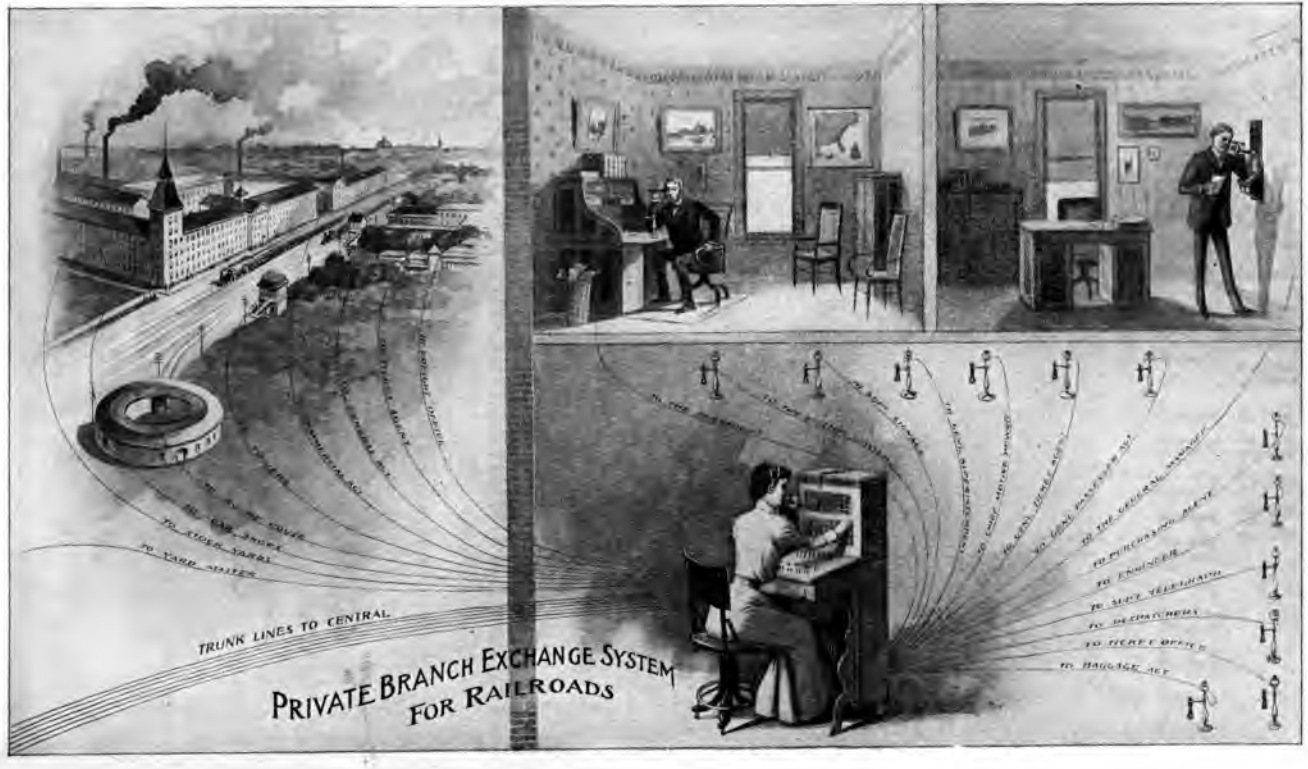
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